Appendix F
Final CHART Assessment for the
Central Valley (CV) Spring-run Chinook ESU

ESU Description

The CV spring-run chinook ESU was originally listed as a threatened species in 1999 (64 FR 50394). The ESU includes all naturally spawned populations of spring-run chinook salmon in the Sacramento River and its tributaries. In 2003, the agency conducted a review to update the ESU's status and also evaluated the ESU status of hatchery stocks within the ESU (NMFS 2003a and NMFS 2003b). Based on these reviews, NMFS NMFS proposed that the CV spring run chinook ESU remain listed as a threatened species (69 FR 33102; June 14, 2004) and that the one artificially propagated spring-run chinook stock in the historical geographic range of the ESU (Feather River Hatchery spring run chinook program) not be considered part of the ESU because of introgression with fall run chinook salmon. On June 28, 2005, NMFS finalized this proposed listing determination (70 FR 37160) and concluded that the Feather River Hatchery spring run chinook program should be included as part of this ESU.

A Technical Recovery Team has been established for the Central Valley recovery planning domain and it has identified historic and extant demographically independent populations of spring chinook (NMFS 2004; NOAA Technical Memorandum NOAA-TM-NMFS-SWFSC-370). The TRT divided the spring-run chinook ESU into four geographic groups. Members of each group inhabit similar environments based on a principle components analysis of environmental variables. The four geographic groups are the southern Cascades, northern Sierra, southern Sierra, and Coast Range. The TRT identified at least 18 historically demographically independent populations of spring run chinook distributed among these four geographic areas, plus an additional seven likely dependent populations that may have been strongly influenced by adjacent independent population. Three of the 18 independent populations are extant (Mill, Deer and Butte Creek populations) and all occur in the Southern Cascade geographic area. Several extant dependent populations have intermittent runs of spring chinook including Big Chico, Antelope, and Beegum Creeks. Recovery planning will likely emphasize the need for having viable populations distributed across the range of the identified geographic areas. Recovery planning efforts are currently focused on working with the CalFed and Central Valley Project Improvement Act programs to implement habitat restoration

projects and other recovery related efforts in the Central Valley. The CHART considered the TRT population structure information in rating each watershed and also solicited input from the TRT on the fish distribution and habitat use information that was compiled as well as the conservation assessment of occupied HSAs. As recovery planning proceeds, we anticipate having additional and better information which may lead to revisions in our recommended critical habitat designations.

CHART Area Assessments

The preliminary CHART assessment for this ESU (NMFS 2004b) was prepared to support our December 10, 2004, critical habitat proposal (69 FR 71880). This final CHART assessment considered new information received during the public comment period regarding fish distribution, habitat use, and the conservation value of occupied habitat areas or watersheds. Based on this new information, the CHART determined that: 1) HSA watershed 550731 should be considered unoccupied and that the occupied habitat of the ESU should therefore be reduced by approximately 10 miles, 2) HSA watershed 551510 should be considered occupied, approximately 5 miles of occupied should be added to the ESU, and that the watershed had a high conservation value to the ESU, and 3) the conservation value of HSA watershed 551921 should be changed from medium to high. Minor fish distribution changes were also made in another HSA watershed (550810), but there was no net change in occupied stream miles for the ESU.

The final CHART assessment for the CV spring run chinook ESU addressed 37 occupied CALWATER HSAs nested in 15 CALWATER Hydrologic Units (HUs) or subbasins (Figures F1 and F2). Four of these HSAs encompass the San Francisco-San Pablo-Suisun Bay complex which constitutes rearing and migration habitat for this ESU (Figure F3). This complex is treated as a separate unit in the following ESU description even though it is not a CALWATER HU. The HSAs were chosen as freshwater critical habitat units because they provide a convenient and systematic way to organize the CHARTs watershed assessments for this ESU. Information presented below for individual HUs (size, counties, total stream miles, occupied stream miles, and habitat use) were generated from GIS from data sets compiled by the NMFS Southwest Region and can be found in Table F1.

Unit 1. Tehama Subbasin (HU#5504)

The Tehama HU is located in the north central portion of the ESU and includes portions

of the mainstem Sacramento River, the lower portions of two westside tributaries (Thomes and Stony Creeks) and the lower portions of three eastside tributaries (Mill Creek, Deer Creek, and Pine Creek). The HU encompasses an areas approximately 1,119 square miles and occurs primarily in Tehama County, but also in portions of Butte and Glenn Counties. The HU contains 2 HSAs, both of which are occupied, and 1,879 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 251 miles of occupied riverine and/or estuarine habitat in the 2 occupied HSAs (Table F1). The CHART concluded that these occupied HSAs contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified several management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and/or estuarine habitat for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F1 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential for the conservation of the ESU.

Unit 2. Whitmore Subbasin (HU#5507)

The Whitmore HU is located in the northeastern portion of the ESU and includes portions of upper Battle Creek (North and South Forks), upper Bear Creek, and the Cow Creek watershed. The HU encompasses an area approximately 913 mi^2 and occurs in Shasta and Tehama Counties. This HU contains 7 HSAs, 3 of which are occupied, and approximately 990 stream miles (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 47 miles of occupied riverine/estuarine habitat in the 3 occupied HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table F1 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F2 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied habitat areas in this subbasin that may be essential to the conservation of the ESU.

Unit 3. Redding Subbasin (HU# 5508)

The Redding HU is located in the northernmost portion of the ESU and includes portions

of the upper Sacramento River mainstem, westside tributaries including Cottonwood Creek (portions of both the Middle and South Forks) and Clear Creek, and the lower portions of several eastside tributaries (Cow Creek, Bear Creek, and lower Battle Creek). The HU encompasses an area of approximately 705 mi^2 and occurs in Shasta and Tehama Counties. This HU contains 2 HSAs, both of which are occupied, and a total of 1,030 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 159 miles of occupied riverine habitat in the 2 occupied HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F3 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 4. Eastern Tehama Subbasin (HU# 5509)

The Eastern Tehama HU is located in the northeastern portion of the ESU and includes portions of several significant watersheds including Mill Creek, Deer Creek, Antelope Creek, and the upper portion of Big Chico Creek. The HU encompasses an area of approximately 896 mi^2 and occurs primarily in Tehama County with small portions in Butte, Shasta, and Plumas Counties. This HU contains 10 HSAs, only 4 of which are occupied, and a total of 1,049 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 117 miles of occupied riverine habitat in the 4 occupied HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat for the HSA that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F4 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 5. Sacramento Delta Subbasin (HU# 5510)

The Sacramento Delta HU is located in the southern portion of the ESU and includes portions of the Sacramento River and Deep Water Ship Channel. The HU encompasses an area of approximately 446 mi^2 and occurs in portions of Yolo, Sacramento, and Solano Counties. This HU contains a single HSA which is occupied, and approximately 355 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 180 miles of occupied riverine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F5 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 6. Valley Putah-Cache Subbasin (HU# 5511)

The Valley Putah-Cache HU is located in the southern portion of the ESU and includes a portion of the Yolo Bypass. This HU encompasses an area of approximately 961 mi^2 and occurs primarily in Yolo and Solano Counties. This HU contains 3 HSAs, one of which is occupied, and 751 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 16 miles of occupied riverine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F6 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The team did not identify any unoccupied areas in this subbasin that may be essential to the conservation of the ESU.

Unit 7. Marysville Subbasin (HU# 5515)

The Marysville HU is located in the central portion of the ESU and includes portions of the Feather River and Yuba River. This HU encompasses an area of approximately 417

mi^2 and occurs primarily in Butte and Yuba Counties with smaller portions located in Sutter and Placer Counties. The HU contains 3 HSAs, all of which are occupied, and 562 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 64 miles of occupied riverine habitat in the 3 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F7 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU; however, the it did conclude that inaccessible stream reaches in the Upper Feather River above Oroville Dam in the adjacent subbasin (HU#5518) may be essential to the conservation of this ESU (NMFS 2004g). Specifically, the team identified the following stream reaches above Oroville Dam that may be essential for conservation of this ESU: from Oroville Dam upstream along the West Branch of the Feather River to the vicinity of Kimshew Falls; along the North Fork of the Feather River upstream of the location of Lake Almanor; along the East Branch of the NF Feather River including Indian Creek and Spanish Creek; the South Middle Fork of the Feather River, and the South Fork of the Feather River upstream to the first natural impassible barrier. Spring-run chinook (and steelhead) historically occurred in the Upper Feather River prior to Pacific Gas and Electric's hydroelectric development in the North Fork watershed and the construction of Oroville Dam. Construction of Oroville Dam extirpated the spring-run chinook (and steelhead) population in this upper watershed. The team concluded that spawning, rearing, an migratory habitat occurs above Oroville Dam in these inaccessible reaches, but it is in better condition for steelhead than spring-run chinook salmon. The feasibility of providing fish passage past Oroville Dam is currently being evaluated through the ongoing FERC relicensing process for this facility. The team concluded this inaccessible habitat may be essential for the conservation of this ESU because the genetic integrity of spring-run chinook in the Lower Feather River has been compromised by Feather River Hatchery practices (i.e. introgression of spring and fall runs in the hatchery), and providing access to the unoccupied habitat above the dam would allow for expansion of the population in this watershed.

Unit 8. Yuba River Subbasin (HU# 5517)

The Yuba River HU is located in the central and eastern portion of the ESU and includes part of the upper Yuba River watershed. This HU encompasses an area of approximately 1,436 mi^2 and occurs in several counties including: Butte, Nevada, Placer, Plumas, Sierra, and Yuba. The HU contains 16 HSAs, 4 of which are occupied, and 2,048 miles of streams (at 1:100,000 hydrography); however, most of the HSAs are outside the recognized boundary of the ESU. Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 22 miles of occupied riverine habitat in the occupied HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F8 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART concluded that inaccessible stream reaches on the Upper Yuba River above Englebright Dam may be essential to the conservation of this ESU, including those upstream reaches on the North Yuba to New Bullards Bar Dam, on the Middle Yuba to Milton Dam, and on the South Yuba to Lake Spaulding (NMFS 2004g). All three forks of the Upper Yuba River historically supported populations of spring chinook (and steelhead). The team considered this area to be essential for conservation of the ESU because it provides one of the largest areas of suitable habitat in the Central Valley that can be accessed by providing passage at one relatively small dam. The Lower Yuba is also considered to have a good "seed" population of spring chinook (and steelhead) and both populations are considered relatively free of hatchery influence. A large, multi-million dollar study program is underway through the CALFED Ecological Restoration Program to evaluate the feasibility of restoring anadromous salmonid populations to the Upper Yuba River.

Unit 9. Valley-American Subbasin (HU# 5519)

The Valley-American HU is located in the south-central and eastern portion of the ESU and includes portions of the Lower American, the mainstem Sacramento River, and the lower Feather River. This HU encompasses an area of approximately 958 mi^2 and occurs primarily in Placer, Sacramento, Sutter, and Yuba Counties. The HU contains 4 HSAs,

only 2 of which are occupied, and approximately 1,188 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 61 miles of occupied riverine habitat in the 2 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F9 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat in this subbasin that may be essential for the conservation of the ESU.

Unit 10. Colusa Basin Subbasin (HU# 5520)

The Colusa Basin HU is located in the central portion of the ESU and includes portions of the mainstem Sacramento River, lower Butte Creek, and the Butte Creek-Sutter Bypass. This HU encompasses an area of approximately 2,767 mi^2 and occurs in portions of Butte, Colusa, Glenn, Sutter, and Yolo Counties. The HU contains 5 HSAs, 3 of which are occupied, and 2,815 miles of streams (at 1:100,000 hydrography) although most of these stream miles are in unoccupied HSAs. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 231 miles of occupied riverine habitat, including the Butte Creek-Sutter Bypass, in the 3 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F10 depicts the specific areas in this HU that are occupied by the ESU and were considered for critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 11. Butte Creek Subbasin (HU# 5521)

The Butte Creek HU is located in the northeastern portion of the ESU and portions of upper Butte Creek. This HU encompasses an area of approximately 207 mi^2 and occurs primarily in Butte County. The HU contains 3 HSAs, only one of which is occupied, and 310 miles of streams (at 1:100,000 hydrography), most of which are in the occupied

HSA. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 15 miles of occupied riverine habitat in the single occupied HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F11 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation.

The CHART also concluded that inaccessible reaches of Upper Butte Creek above Centerville Dam upstream to Butte Meadow may be essential to the conservation of this ESU (NMFS 2004g). It is uncertain whether this area was historically used by the ESU, but spawning, rearing, and migration habitat is present in the inaccessible areas and is thought to be in good condition. The team believes this area may be essential for conservation because current spring run chinook (and steelhead) spawning in this watershed is all below an elevation of 1,000 ft and other spring-run chinook populations within the ESU typically spawn above 2,000 ft. High water temperatures in the lower portion of Butte Creek have led to significant spring-run chinook pre-spawning mortalities in recent years, and the team concluded that improved fish passage over the Centerville Diversion Dam would increase the range of this ESU and reduce the risk of adult losses in the lower stream reaches. The team expects that feasibility of passage at the Centerville Diversion Dam will be evaluated through the upcoming FERC relicensing process for the facility.

Unit 12. Ball Mountain Subbasin (HU# 5523)

The Ball Mountain HU is located in the northwestern portion of the ESU and includes a portion of upper Thomes Creek. This HU encompasses an area of approximately 334 mi^2 and occurs almost entirely in Tehama County. The HU contains 3 HSAs, only 1 of which is occupied, and 521 miles of streams (at 1:100,000 hydrography), most of which is in the Thomes Creek watershed. Fish distribution and habitat use data compiled by NMFS biologists identify approximately 15 miles of occupied riverine habitat in the one occupied HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the

total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F12 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of this ESU.

Unit 13. Shasta Bally Subbasin (HU# 5524)

The Shasta Bally HU is located in the northwestern portion of the ESU and includes portions of the South Fork Cottonwood Creek and Beegum Creek. This HU encompasses an area of approximately 905 mi^2 and occurs primarily in Shasta and Tehama Counties. The HU contains 9 HSAs, 4 of which are occupied, and approximately 1,003 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 50 miles of occupied riverine habitat in the 4 HSAs (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F13 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied areas in this subbasin that may be essential for the conservation of this ESU.

Unit 14. North Diablo Range Subbasin (HU# 5543)

The North Diablo Range HU is located in the southernmost portion of the ESU and includes only a small portion of the south-central Delta. This HU encompasses an area of approximately 315 mi^2 and occurs primarily in Alameda, Contra Costa, and San Joaquin Counties. The HU contains only a single HSA which is partially occupied, and 336 miles of streams (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify only approximately 4 miles of occupied riverine/estuarine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine habitat identified for each HSA watershed that contain spawning/rearing, rearing/migration, or migration PCEs, as

well as management activities that may affect the PCEs in each HSA. Map F10 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART team did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 15. San Joaquin Delta Subbasin (HU# 5544)

The San Joaquin Delta HU is located in the southernmost portion of the ESU aand includes portions of the central and south Delta. This HU encompasses an area of approximately 628 mi^2 and occurs primarily in Contra Costa and San Joaquin counties. The HU contains a single HSA which is occupied, and approximately 455 miles of streams and channels (at 1:100,000 hydrography). Fish distribution and habitat use data compiled by NMFS biologists identify approximately 142 miles of occupied riverine/estuarine habitat in this HSA (Table F1). The CHART concluded that these occupied areas contained one or more PCEs (i.e. spawning, rearing, or migratory habitat) for this ESU and identified management activities that may affect the PCEs. Table F2 summarizes the total miles of occupied riverine and estuarine reaches identified for each HSA watershed that contains spawning/rearing, rearing/migration, or migration PCEs, as well as management activities that may affect the PCEs in each HSA. Map F15 depicts the specific areas in this HU that are occupied by the ESU and were considered for the critical habitat designation. The CHART did not identify any unoccupied habitat areas in this subbasin that may be essential for the conservation of the ESU.

Unit 16. Suisun Bay (HU# 2207), San Pablo Bay (HU#2206) and San Francisco Bay (HU#s 2203 and 2204)

Portions of four HUs (2207, 2206, 2203, 2204) comprise the Suisun Bay-San Pablo-San Francisco Bay complex that is utilized by this ESU. These 4 HUs contain both estuarine habitat in the Bay complex as well as freshwater tributaries to the Bay complex, but only the 4 HSAs (HSAs: 220710, 220610, 220410, and 220312) that comprise the estuarine Bay complex are occupied by this ESU (Table F1). These 4 HSAs encompass approximately 427 mi^2 of estuarine habitat that serves as a rearing and migratory habitat and a corridor providing connectivity between freshwater spawning, rearing, and migratory habitats for this ESU in the Sacramento-San Joaquin basin and the ocean. The CHART concluded that these four HSAs were occupied and contained PCEs for migratory habitat that support this ESU, and identified management activities that may affect the PCEs (Table F2). Map F16 depicts the specific HSAs in this complex which are occupied and were considered for the critical habitat designation. The CHART did

not identify any unoccupied areas in the San Francisco Bay-San Pablo-Suisun Bay complex that may be essential for the conservation of this ESU.

Unoccupied Habitat Outside the ESU Range that May be Essential to ESU Conservation

The CHART identified several unoccupied habitat areas in the Central Valley that are outside the current range of the CV spring-run chinook ESU, but that may be essential for its conservation (NMFS 2004g). These unoccupied areas are described below:

(1) Lower and Upper Mokelumne River. The CHART concluded that currently unoccupied portions of the Lower Mokelumne River from its confluence with the San Joaquin River upstream to Comanche Dam may be essential for the conservation of this ESU. In addition, the team concluded that inaccessible reaches of the Upper Mokelumne River above Comanche Dam up to Bald Rock Falls (which is 7 miles above Electra Dam) may be essential to the conservation of this ESU. The Mokelumne River historically supported large runs of spring run chinook salmon which have been extirpated. The lower portion of the Mokelumne River would be essential as a migratory corridor for spring chinook access to the upper watershed above Comanche Dam. Suitable habitat exists above Comanche Dam, but it has been altered by Comanche and Pardee reservoirs. The Central Valley TRT identifies this as a historically independent population and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(2) Lower and Middle Stanislaus River. The CHART concluded that currently unoccupied reaches of the Lower Stanislaus River from its confluence with the San Joaquin River up to Goodwin Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Stanislaus River from Goodwin Dam to New Melones Dam may be essential to the conservation of this ESU. The Stanislaus River historically supported a large population of spring-run chinook salmon which was extirpated with the construction of Goodwin Dam. The lower portion of the Stanislaus River would be essential as a migratory corridor for spring chinook access to the upper watershed above Goodwin Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat exists above Goodwin Dam and fish passage at the Dam is thought to be feasible. The Central Valley TRT identifies this as a historically independent population and indicates that multiple independent populations

of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(3) Lower and Middle Tuolumne River. The CHART concluded that currently unoccupied reaches of the Lower Tuolumne River from its confluence with the San Joaquin River up to LaGrange Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Tuolumne River between LaGrange and New Don Pedro Dams may be essential to the conservation of this ESU. The Tuolumne River historically supported a large population of spring-run chinook salmon which was extirpated with the construction of LaGrange Dam. The lower portion of the Stanislaus River would be essential as a migratory corridor for spring chinook access to the upper watershed above LaGrange Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat is thought to exist above LaGrange Dam for this ESU although feasibility of providing passage above the dam is uncertain. The Central Valley TRT identifies this as a historically independent population that is now extirpated and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

(4) Lower and Middle Merced River. The CHART concluded that currently unoccupied reaches of the Lower Merced River from its confluence with the San Joaquin River up to Crocker-Huffman Dam may be essential for the conservation of this ESU. The team also concluded that inaccessible habitat reaches in the Middle Merced River between Crocker-Huffman and Exchequer Dams may be essential to the conservation of this ESU. The Merced River historically supported a large population of spring-run chinook salmon which was extirpated with the construction of Crocker-Huffman Dam. The lower portion of the Merced River would be essential as a migratory corridor for spring-chinook access to the upper watershed above Crocker-Huffman Dam. Depending upon dam operations and resulting instream water temperatures, rearing and spawning habitat might be available in this lower reach. Suitable habitat is thought to exist above Crocker-Huffman Dam for this ESU although passage at the Dam is thought to be feasible because of its low height. The Central Valley TRT identifies this as a historically independent population that is now extirpated and indicates that multiple independent populations of this ESU distributed throughout the Central Valley may be required to recover this ESU.

Final CHART Conservation Value Rating

Freshwater/Estuarine Areas

After reviewing the best available scientific data regarding critical habitat for this ESU, the CHART concluded that most of the occupied HSAs were of high or medium conservation value to the ESU. Of the 37 occupied HSAs that were evaluated, 27 were rated as having high conservation value, 3 were rated as having medium conservation value, and 7 were rated as having low conservation value. Table F3 summaries the CHARTs PCE/watershed scores and preliminary conservation value ratings (i.e. low, medium or high) for each occupied HSA. Map F17 shows the overall spatial distribution of conservation ratings (i.e. low, medium and high) for occupied HSAs within the freshwater/estuarine range of the ESU.

Marine Areas

NMFS determined that marine areas did not warrant consideration as critical habitat for this ESU.

References and Sources of Information

NMFS 2003a. Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead. West Coast Salmon Biological Review Team; Northwest Fisheries Science Center and Southwest Fisheries Science Center. July 2003.

NMFS 2003b. Hatchery Broodstock Summaries and Assessments for Chum, Coho, and Chinook Salmon and Steelhead Stocks within ESUs listed under the ESA. Salmon and Steelhead Hatchery Assessment Group/NOAA Fisheries; Northwest Fisheries Science Center and Southwest Fisheries Science Center.

NMFS 2004. Population Structure of threatened and endangered chinook salmon ESU in California's Central Valley. NOAA-TM-NMFS-SWFSC-370.

NMFS 2004b. Draft Findings of NMFS' Critical Habitat Development and Review Teams (CHARTs) for 7 ESUs of Salmon and O. mykiss ESUs in California. Main Report and 7 appendices. Prepared by NMFS, Southwest Region.

Federal Register Notices

64 FR 50394 - CV spring run chinook Listing Determination

69 FR 33102 - Proposed Listing Determinations for 27 West Coast Salmon and Steelhead ESUs

69 FR 71880 - Proposed Critical Habitat Designations for 7 ESUs of Salmon and Steelhead in California

70 FR 37160 - Final Listing Determinations for 16 ESUs of West Coast Salmon and Final 4(d) Protective Regulations for Threatened Salmonid ESUs

Table F1. Spring-run Chinook Salmon ESU: Occupancy, miles of occupied habitat, and geographic information by Hydrologic Unit and Hydrologic Subarea

HSA falls within and outside of ESU
HSA falls entirely outside of ESU

Note: Occupied Miles totals can be misleading for units 5510, 5511, 5515, 5519, 5520 as mainstem Sacramento River, Feather River, Butte Creek-Sutter Bypass straddle the unit boundaries

HU NUMBER	HU NAME	Major Stream / Watershed in HU	HU Occupied (Y or N)	Acres in HU	Square Miles in HU	Stream Miles (1:100k**) in HU	Occupied Stream Miles	Occupied Stream Miles (Spawning)	Occupied Stream Miles (Natal and Non-natal Rearing)	Occupied Stream Miles (Migration)	County HU Falls within	Acres of County in HU	Square Miles of County in HU	Percent of HU by County	HSA NUMBER	HSA NAME	HSA Occupied (Y or N)	Acres in HSA	Square Miles in HSA	Stream Miles (1:100k) in the HSA
2207	Suisun	Suisun Bay	Y	410,350	641	746	Bay Corridor	Bay Corridor	Bay Corridor	Bay Corridor	Alameda	56	269	42%						
											Contra Costa	171,934	47	7%	220710	Suisun Bay	Y	36,024	56	Bay
											Napa	30,344	2	0%	220721	Benicia	N	56,912	89	80
											Sacramento	1,027	323	50%	220722	Suisun Creek	N	28,367	44	58
											Solano	206,989			220723	Suisun Slough	N	97,025	152	239
															220724	Grizzly Island	N	28,310	44	111
															220731	Pittsburg	N	76,020	119	139
															220732	Walnut Creek	N	54,278	85	100
															220733	Martinez	N	33,418	52	58
5504	Tehama	Valley sections of Oat-Elder Stony-Reed-Pine-Red Bank	Y	716,144	1119	1879	251	38	251	147	Tehama	579,211	905	81%						
											Butte	84,931	133	12%	550410	Lower Stony Creek	Y	29,069	45	91
											Glenn	52,002	81	7%	550420	Red Bluff	Y	687,076	1,073	1788
5507	Whitmore	Upper NF Battle-NF Bear-South Cow-Clover-Oak Run	Y	584,320	913	990	47	40	47	40	Shasta	454,547	710	78%						
											Tehama	129,773	203	22%	550711	Inks Creek	Y	18,831	29	28
															550712	Battle Creek	Y	230,971	361	341
															550721	Ash Creek	N	11,417	18	19
															550722	Inwood	Y	80,479	126	138
															550731	South Cow Creek	N	50,429	79	85
															550732	Old Cow Creek	N	84,122	131	153
															550733	Little Cow Creek	N	108,071	169	227
5508	Redding	Valley sections of Cottonwood-Cow-Ash	Y	451,223	705	1030	159	75	159	139	Shasta	265,068	414	59%						
											Tehama	186,155	291	41%	550810	Enterprise Flat	Y	233,670	365	550
															550820	Lower Cottonwood	Y	217,553	340	481
5509	Eastern Tehama	Upper Deer-Mill-Antelope-Big Chico	Y	573,829	896	1049	117	96	117	117	Shasta	3,319	5	1%						
											Tehama	512,944	801	89%	550914	Big Chico Creek	Y	46,159	72	85
											Plumas	109	0	0%	550915	Mud Creek	N	19,323	30	59
											Butte	57,458	90	10%	550916	Pine Creek	N	69,300	108	171
															550920	Deer Creek	Y	133,316	208	206
															550941	Big Dry Creek	N	28,888	45	51
															550942	Upper Mill Creek	Y	83,637	131	128
															550962	Dye Creek	N	26,006	41	55
															550963	Antelope Creek	Y	92,466	144	158
															550964	Paynes Creek	N	55,702	87	105
															550965	Salt Creek	N	19,032	30	32
5510	Sacramento Delta	Sacramento River-Yolo Bypass	Y	285,422	446	355	180		153	180	Yolo	92,191	144	32%						
											Sacramento	112,178	175	39%	551000	Sacramento Delta	Y	285,422	446	355
											Solano	81,053	127	28%						
5511	Valley Putah-Cache	Putah	Y	615,528	961	751	16		16	16	Colusa	76	0	0%						
											Yolo	361,302	564	59%	551110	Elmira	N	246,988	386	313
											Napa	115	0	0%	551120	Lower Putah Creek	Y	249,336	389	229
											Solano	254,036	397	41%	551130	Lower Cache Creek	N	119,203	186	209
5515	Marysville	Feather-Yuba-Bear	Y	266,718	417	562	64	34	63	58	Butte	104,775	164	39%						
											Yuba	117,208	183	44%	551510	Lower Bear River	Y	76,927	120	185
											Sutter	23,006	36	9%	551530	Lower Yuba River	Y	28,145	44	41
											Placer	21,729	34	8%	551540	Lower Feather River	Y	161,646	252	336
5517	Yuba River	Yuba-Dry	Y	919,595	1436	2048	22	22	22	22	Butte	47,088	74	5%						
											Nevada	338,354	529	37%	551712	Browns Valley	Y	32,753	51	82
											Placer	12,558	20	1%	551713	Mildred Lake	Y	46,056	72	94
											Plumas	12,005	19	1%	551714	Englebright	Y	35,512	55	86
											Sierra	309,482	483	34%	551720	Nevada City	Y	54,499	85	122
											Yuba	200,108	313	22%	551731	Shady Creek	N	30,179	47	71
															551732	North Bloomfield	N	69,907	109	165
															551733	Canyon Creek	N	32,997	52	53
															551734	Lake Spaulding	N	96,106	150	178
															551741	North San Juan	N	54,176	85	129
															551742	Camptonville	N	57,012	89	113
															551743	Millde Yuba	N	23,805	37	41
															551751	Bullards Bar	N	49,017	77	118

																551752	North Yuba	N	39,349	61	95
																551753	Goodyears Bar	N	131,999	206	311
																551754	Sierra City	N	90,498	141	172
																551760	South Honcut Creek	N	75,736	118	219
5519	Valley-American	American- Lower Coon- Auburn	Y	613,101	958	1188	61		61	52	El Dorado	1,569	2	0%							
											Placer	174,403	272	28%	551911	Franklin	N	62,182	97	99
											Sacramento	290,552	454	47%	551912		N	65,397	102	84
											Sutter	69,045	108	11%	551921	Lower American	Y	195,188	305	418
											Yolo	1,397	2	0%	551922	Pleasant Grove	Y	290,333	454	588
											Yuba	76,136	119	12%						
5520*	Colusa Basin	Sutter Bypass- Colusa Drain-	Y	1,771,171	2767	2815	231		231	229	Butte	301,676	471	17%						
											Colusa	562,580	879	32%	552010	Sycamore-Sutter	Y	246,952	386	155
											Glenn	434,829	679	25%	552021	Colusa Trough	Y	891,690	1,393	1648
															552022	Orland	N	36,543	57	12
											Sutter	297,222	464	17%	552030	Sutter Bypass	Y	183,595	287	168
											Yolo	174,865	273	10%	552040	Butte Basin	Y	412,391	644	833
5521	Butte Creek	Butte- Little Chico	Y	132,405	207	310	15	15	15	15	Tehama	5,767	9	4%						
											Plumas	688	1	1%	552110	Upper Dry Creek	N	15,877	25	50
											Butte	125,949	197	95%	552120	Upper Butte Creek	N	17,761	28	49
															552130	Upper Little Chico	Y	98,767	154	211
5523	Ball Mountain	Upper Thomes-Elder	Y	213,899	334	521	15	15	15	15	Trinity	94	0	0%						
											Tehama	213,712	334	100%	552310	Thomes Creek	Y	123,466	193	301
											Mendocino	92	0	0%	552321	Elder Creek	N	60,503	95	149
															552322	Red Bank Creek	N	29,930	47	71
5524	Shasta Bally	SF-MF-NF- Cottonwood- Clear Creek	Y	579,290	905	1003	50	28	50	50	Trinity	825	1	0%						
											Shasta	360,702	563	62%	552433	South Fork	Y	110,519	173	192
											Tehama	217,763	340	38%	552434	Wells Creek	N	61,780	96	120
															552435	Ono	N	72,938	114	116
															552436	Platina	Y	140,502	219	264
															552440	Spring Creek	Y	34,898	55	67
															552461	Whiskeytown Lake	N	6,880	11	9
															552462	Kanaka Peak	Y	18,113	28	37
															552463	Middle Clear	N	47,350	74	77
															552464	French Gulch	N	86,311	135	122
5543	North Diablo Range	Upper Mountain House Corral Hollow	Y	201,825	315	336	4		4	4	Alameda	43,692	68	22%						
											Contra Costa	96,766	151	48%	554300	North Diablo Range	Y	201,825	315	336
											Sacramento	1,460	2	1%						
											San Joaquin	59,908	94	30%						
5544	San Joaquin Delta	Lower San Joaquin	Y	402,211	628	455	142		142	142	Alameda	3,428	5	1%						
											Contra Costa	92,390	144	23%	554400	San Joaquin Delta	Y	402,211	628	455
											Sacramento	11,399	18	3%						
											San Joaquin	294,902	461	73%						
											Stanislaus	93	0	0%						

**Total Stream Miles calculated from blueline streams represented on 1:100,000 USGS Topographic Maps

Table F2. Summary of Occupied Subbasins/Watersheds. PCE's and Management Activities Affecting PCE's for the Central Valley Spring-run Chinook ESU

Map Code	Basin	Watershed	Calwater Unit	Spawning/Rearing PCEs (mi)	Rearing/Migration PCEs (mi)	Presence/Migration Only PCEs (mi)	Management Activities*
	San Francisco Bay	Bay Waters	220312				AW, PP, IS, DK, BS, ID
	San Francisco Bay	Bay Channel	220410				AW, PP, IS, DK, BS, ID
	San Francisco Bay	San Pablo Bay	220610				AW, PP, IS, DK, BS, ID
	Suisun Bay	Suisun Bay	220710				AW, PP, IS, DK, BS, WE, ID
	Suisun Bay	Benicia	220721				
	Suisun Bay	Suisun Creek	220722				
	Suisun Bay	Suisun Slough	220723				
	Suisun Bay	Grizzly Island	220724				
	Suisun Bay	Pittsburg	220731				
	Suisun Bay	Walnut Creek	220732				
	Suisun Bay	Martinez	220733				
	Tehama	Lower Stony Creek	550410	23	23	23	AW, FP, DO
	Tehama	Red Bluff	550420	228	228	228	AW, PP, DK, BS, UD, RM
	Whitmore	Inks Creek	550711	2	2	2	RM
	Whitmore	Battle Creek	550712	40	40	40	AW, FP, WD
	Whitmore	Ash Creek	550721				
	Whitmore	Inwood	550722	6	6	6	AW, MW, UD
	Whitmore	South Cow Creek	550731				
	Whitmore	Old Cow Creek	550732				
	Whitmore	Little Cow Creek	550733				
	Redding	Enterprise Flat	550810	98	98	98	WS, DO, FP, PP, GM, RM
	Redding	Lower Cottonwood	550820	61	61	61	AW, FP, RM
	Eastern Tehama	Big Chico Creek	550914	9	9	9	FP, FM, RM, RD
	Eastern Tehama	Mud Creek	550915				
	Eastern Tehama	Pine Creek	550916				
	Eastern Tehama	Deer Creek	550920	35	35	35	FM, RM
	Eastern Tehama	Big Dry Creek	550941				
	Eastern Tehama	Upper Mill Creek	550942	47	47	47	FM, RM

	Eastern Tehama	Dye Creek	550962				
	Eastern Tehama	Antelope Creek	550963	25	25	25	FM, FP, AW, RM
	Eastern Tehama	Paynes Creek	550964				
	Eastern Tehama	Salt Creek	550965				
	Sacramento Delta	Sacramento Delta	551000	153	180	180	AW, PP, IS, DK, BS
	Valley Putah-Cache	Elmira	551110				
	Valley Putah-Cache	Lower Putah Creek	551120	16	16	16	
	Marysville	Lower Bear River	551510	5	5	0	AW, BS, UD
	Marysville	Lower Yuba River	551530	19	19	19	AW, MW, PP, DK, BS, FP
	Marysville	Lower Feather River	551540	40	40	40	WD, WS, PP, HM, DO
	Yuba River	Browns Valley	551712	17	17	17	AW, MW
	Yuba River	Mildred Lake	551713	0.4	0.4	0.4	AW, MW
	Yuba River	Englebright	551714	1	1	1	AW, FP, DO,
	Yuba River	Nevada City	551720	4	4	4	AW
	Yuba River	South Honcut Creek	551760				
	Valley-American	Franklin	551911				
	Valley-American		551912				
	Valley-American	Lower American	551921	10	10	10	AW, MW, WS, UD, HM, DO, PP
	Valley-American	Pleasant Grove	551922	47	47	47	AW, FP, PP, DK, BS
	Colusa Basin	Sycamore-Sutter	552010	83	83	83	AW, HR, PP, DK, BS
	Colusa Basin	Colusa Trough	552021				
	Colusa Basin	Orland	552022				
	Colusa Basin	Sutter Bypass	552030	70	70	70	AW, IS, DK, BS, FP, WH
	Colusa Basin	Butte Basin	552040	76	76	76	AW, FP, PP, DK, BS
	Butte Creek	Upper Dry Creek	552110				
	Butte Creek	Upper Butte Creek	552120				
	Butte Creek	Upper Little Chico	552130	15	15	15	WD
	Bull Mountain	Thomes Creek	552310	15	15	15	RM
	Bull Mountain	Elder Creek	552321				
	Bull Mountain	Red Bank Creek	552322				
	Shasta Bally	South Fork	552433	22	22	22	FM, RM, RD
	Shasta Bally	Wells Creek	552434				

	Shasta Bally	Ono	552435				
	Shasta Bally	Platina	552436	19	19	19	FM, RM, RD
	Shasta Bally	Spring Creek	552440	2	2	2	WD, WS, FP, PP, HM, DO
	Shasta Bally	Whiskeytown Lake	552461				
	Shasta Bally	Kanaka Peak	552462	7	7	7	HR, GM, WD, WS, DO
	Shasta Bally	Middle Clear	552463				
	Shasta Bally	French Gulch	552464				
	North Diablo Range	North Diablo Range	554300	4	4	4	AW, MW, IS, PP
	San Joaquin Delta	San Joaquin Delta	554400	142	142	142	AW, MW, PP, IS, EF

*Management Activities Codes:

AP, Adult passage
AW - Agricultural water withdrawls
BS - Streamband stabilization for flood control
DK - Diking
DO - Dam operations
EF - Entrainment and flow alterations
FM - Forest management
FP - Fish passage
GM - Gravel mining
HM - Hatchery management
HR - Habitat restoration
ID - Industrial development
IS - Invasive/non-native species
MW - Municipal water withdrawls
PP - Point and non-point water pollution
RD - Roads
RM- Rangeland management
SF - Seasonal flooding for flood control
UD - Urban development
WD - Water diversion for hydroelectric
WE - Wetland/Estuary management
WH - Wildlife habitat management
WS - Water storage for flood control

Table F3. Summary of Preliminary Scores and Overall Rankings of Conservation Values for Critical Habitat for HSA watersheds occupied by the Central Valley Spring-run Chinook ESU

Map Code	Basin	Watershed	Calwater Unit	Total Score (0-18)	Comments / Other Considerations	Conservation Value
	San Francisco Bay	Bay Waters	220312	10		High
	San Francisco Bay	Bay Channel	220410	5		Low
	San Francisco Bay	San Pablo Bay	220610	10		High
	Suisun Bay	Suisun Bay	220710	10		High
	Suisun Bay	Benicia	220721	0		Not Occupied
	Suisun Bay	Suisun Creek	220722	0		Not Occupied
	Suisun Bay	Suisun Slough	220723	0		Not Occupied
	Suisun Bay	Grizzly Island	220724	0		Not Occupied
	Suisun Bay	Pittsburg	220731	0		Not Occupied
	Suisun Bay	Walnut Creek	220732	0		Not Occupied
	Suisun Bay	Martinez	220733	0		Not Occupied
	Tehama	Lower Stony Creek	550410	7		Medium
	Tehama	Red Bluff	550420	15		High
	Whitmore	Inks Creek	550711	5		Low
	Whitmore	Battle Creek	550712	16		High
	Whitmore	Ash Creek	550721	0		Not Occupied
	Whitmore	Inwood	550722	5		Low
	Whitmore	South Cow Creek	550731	0		Not Occupied
	Whitmore	Old Cow Creek	550732	0		Not Occupied
	Whitmore	Little Cow Creek	550733	0		Not Occupied
	Redding	Enterprise Flat	550810	13		High
	Redding	Lower Cottonwood	550820	8	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High

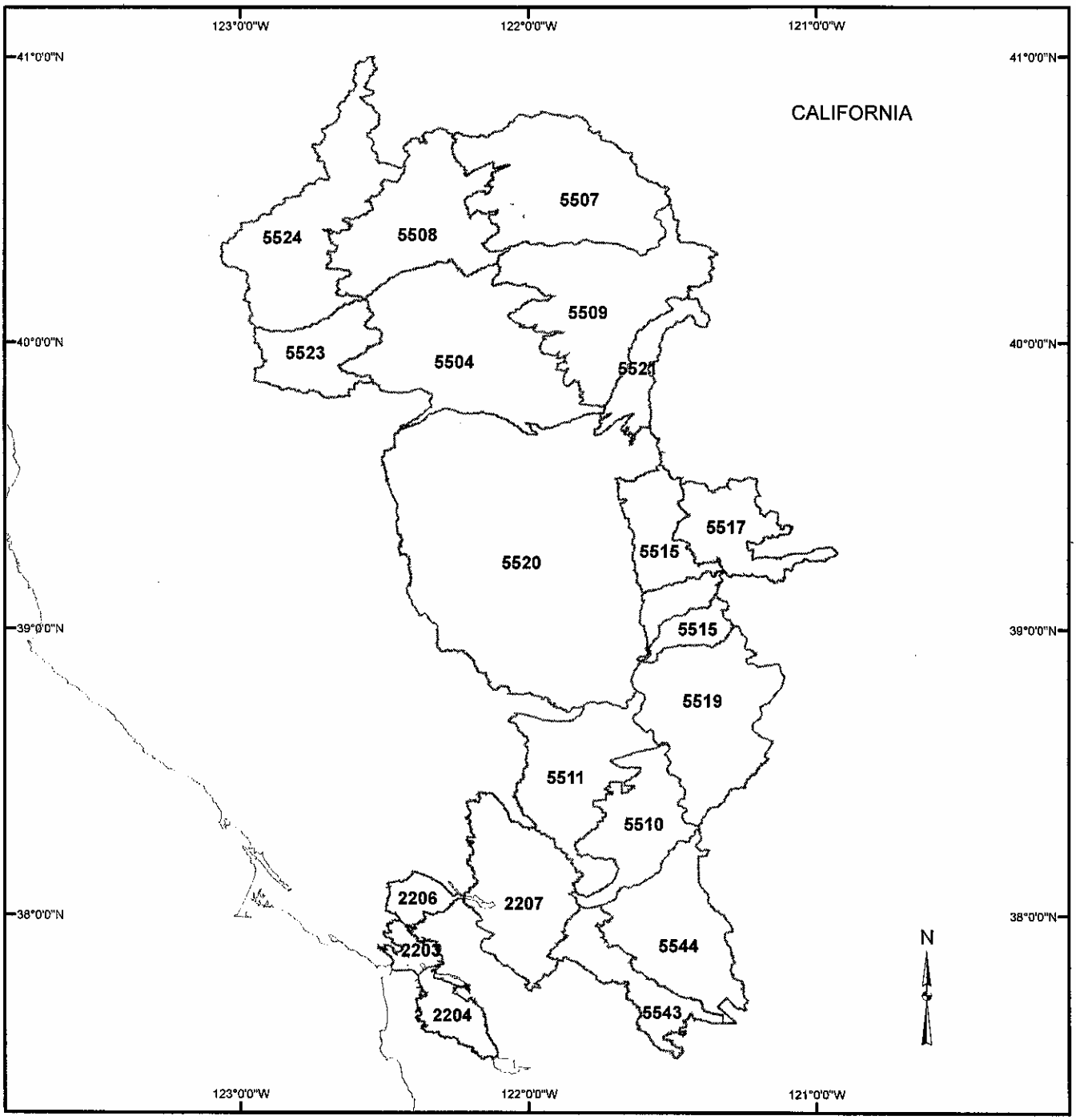
	Eastern Tehama	Big Chico Creek	550914	12		High
	Eastern Tehama	Mud Creek	550915	0		Not Occupied
	Eastern Tehama	Pine Creek	550916	0		Not Occupied
	Eastern Tehama	Deer Creek	550920	17		High
	Eastern Tehama	Big Dry Creek	550941	0		Not Occupied
	Eastern Tehama	Upper Mill Creek	550942	17		High
	Eastern Tehama	Dye Creek	550962	0		Not Occupied
	Eastern Tehama	Antelope Creek	550963	11	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Eastern Tehama	Paynes Creek	550964	0		Not Occupied
	Eastern Tehama	Salt Creek	550965	0		Not Occupied
	Sacramento Delta	Sacramento Delta	551000	14		High
	Valley Putah-Cache	Elmira	551110	0		Not Occupied
	Valley Putah-Cache	Lower Putah Creek	551120	11		High
	Marysville	Lower Bear River	551510	10		High
	Marysville	Lower Yuba River	551530	13		High
	Marysville	Lower Feather River	551540	11	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Yuba River	Browns Valley	551712	14		High
	Yuba River	Mildred Lake	551713	5		Low
	Yuba River	Englebright	551714	12		High
	Yuba River	Nevada City	551720	7		Medium
	Yuba River	South Honcut Creek	551760	0		Not Occupied
	Valley-American	Franklin	551911	0		Not Occupied
			551912	0		Not Occupied
	Valley-American	Lower American	551921	11		High

	Valley-American	Pleasant Grove	551922	10	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Colusa Basin	Sycamore-Sutter	552010	12		High
	Colusa Basin	Colusa Trough	552021	5		High
	Colusa Basin	Orland	552022	0		Not Occupied
	Colusa Basin	Sutter Bypass	552030	15		High
	Colusa Basin	Butte Basin	552040	16		High
	Butte Creek	Upper Dry Creek	552110	0		Not Occupied
	Butte Creek	Upper Butte Creek	552120	0		Not Occupied
	Butte Creek	Upper Little Chico	552130	15		High
	Bull Mountain	Thomes Creek	552310	5		Low
	Bull Mountain	Elder Creek	552321	0		Not Occupied
	Bull Mountain	Red Bank Creek	552322	0		Not Occupied
	Shasta Bally	South Fork	552433	3		Low
	Shasta Bally	Wells Creek	552434	0		Not Occupied
	Shasta Bally	Ono	552435	0		Not Occupied
	Shasta Bally	Platina	552436	11	Initially considered moderate, changed to High based on recommendations byt the CVTRT to assign high conservation values to any streams in CV that are utilized for spawning or early rearing.	High
	Shasta Bally	Spring Creek	552440	12		High
	Shasta Bally	Whiskeytown Lake	552461	0		Not Occupied
	Shasta Bally	Kanaka Peak	552462	12		High
	Shasta Bally	Middle Clear	552463	0		Not Occupied
	Shasta Bally	French Gulch	552464	0		Not Occupied
	North Diablo Range	North Diablo Range	554300	8		Medium
	San Joaquin Delta	San Joaquin Delta	554400	5		Low

Figures F1 and F2: CALWATER Hydrologic Units and Hydrologic Subareas within the range of the Central Valley spring-run chinook ESU

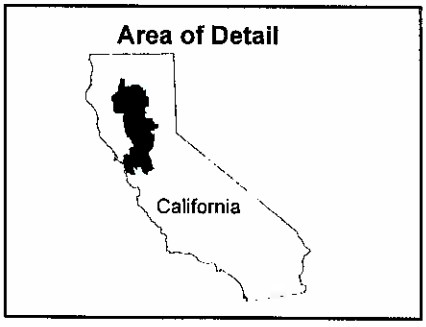
Figure F3: CALWATER Hydrologic Units comprising the San Francisco-San Pablo-Suisun Bay Complex

Map of the California Central Valley Spring- run O. tshawytscha ESU

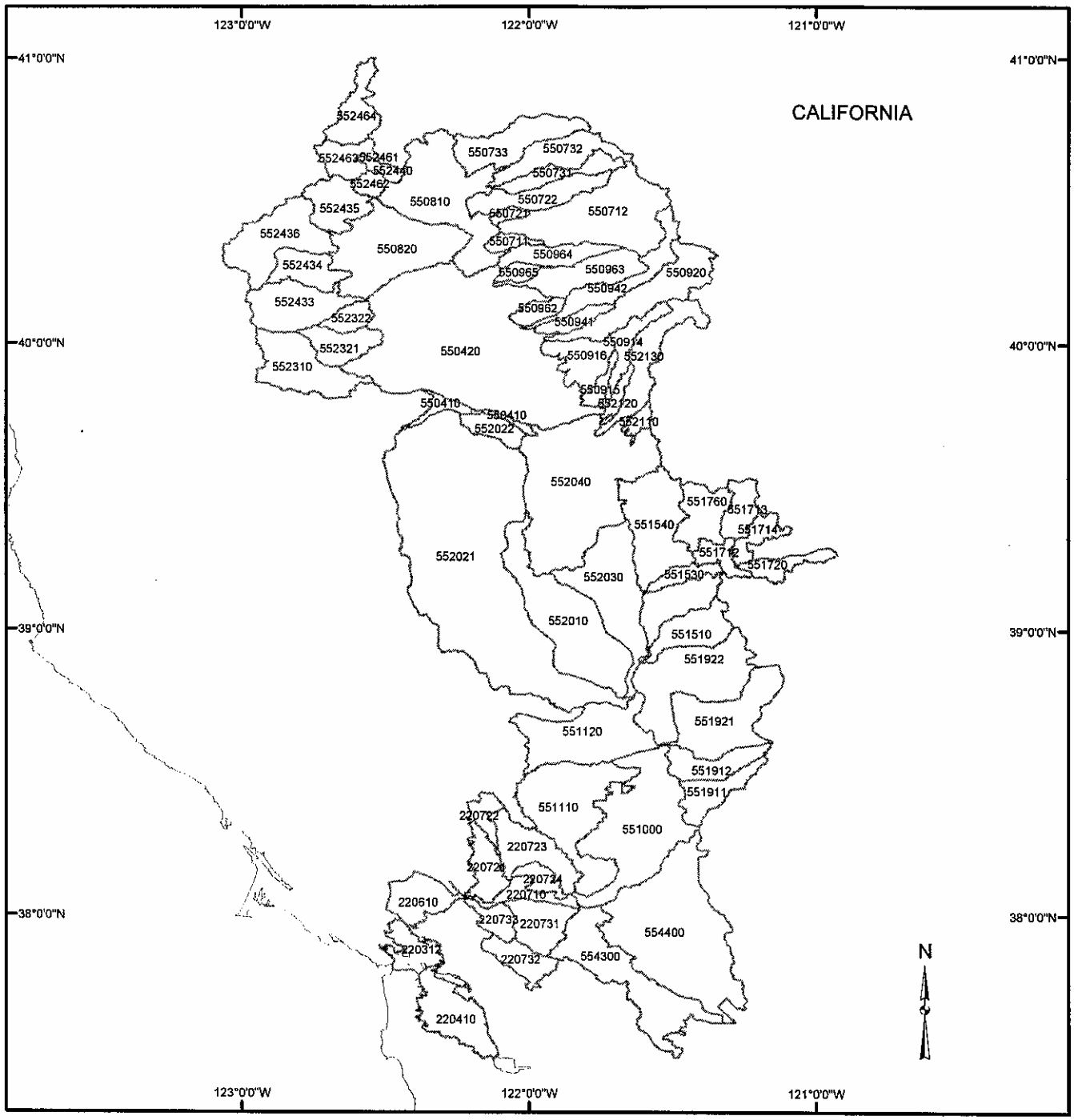


Hydrologic Unit Boundaries

State Boundary



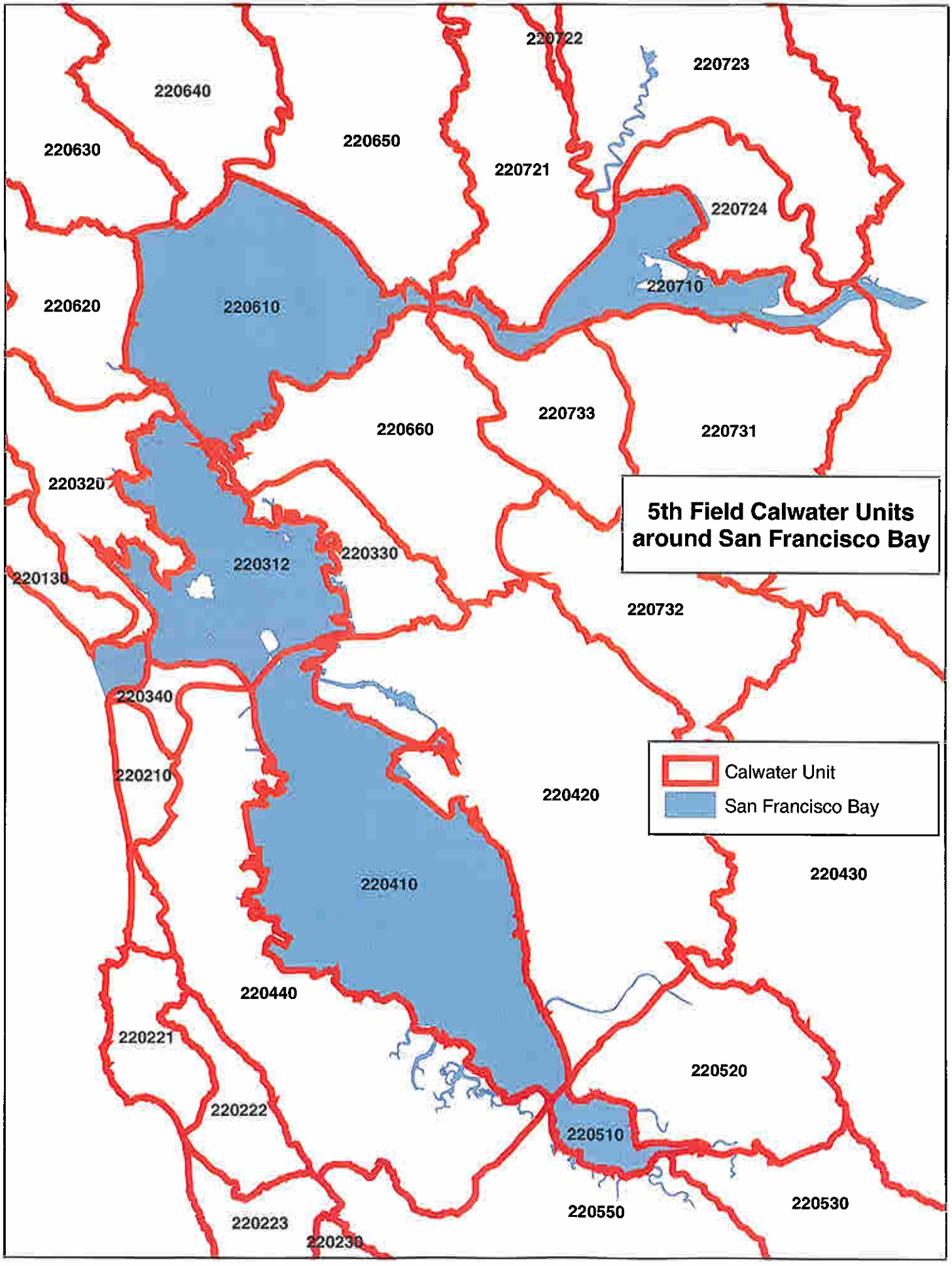
Map of the California Central Valley Spring- run O. tshawytscha ESU



Subbasin Boundaries

State Boundary

Area of Detail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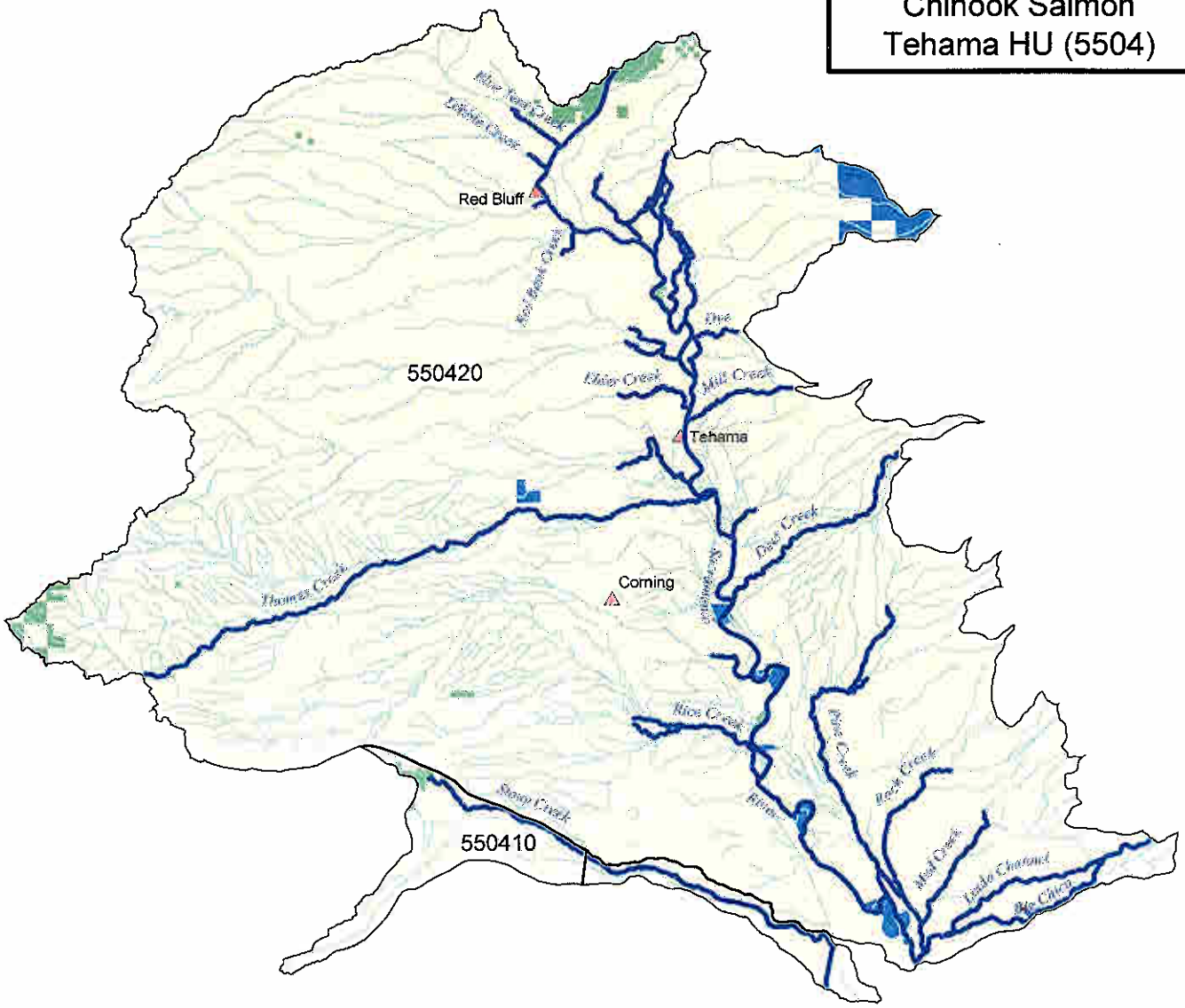
220312
220330
220130
220732
220340
220210
220420
220410
220430
220440
220221
220520
220222
220510
220550
220530
220223
220230
5th Field Calwater Units around San Francisco Bay
Calwater Unit
San Francisco Bay

Maps F1 through F16: Central Valley spring run chinook ESU - Habitat Areas (Units) Considered for Critical Habitat Designation

F1 - Unit 5504 (Tehama HU)
F2 - Unit 5507 (Whitmore HU)
F3 - Unit 5508 (Redding HU)
F4 - Unit 5509 (Eastern Tehama HU)
F5 - Unit 5510 (Sacramento Delta HU)
F6 - Unit 5511 (Valley Putah-Cache HU)
F7 - Unit 5515 (Marysville HU)
F8 - Unit 5517 (Yuba River HU)
F9 - Unit 5519 (Valley-American HU)
F10 - Unit 5520 (Colusa Basin HU)
F11 - Unit 5521 (Butte Creek HU)
F12 - Unit 5523 (Ball Mountain HU)
F13 - Unit 5524 (Shasta Bally HU)
F14 - Unit 5543 (North Diablo Range HU)
F15 - Unit 5544 (San Joaquin HU)
F16 - San Francisco-San Pablo-Suisun Bay Unit

Land Ownership
Central Valley Spring-run Chinook Salmon
Tehama HU (5504)



- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

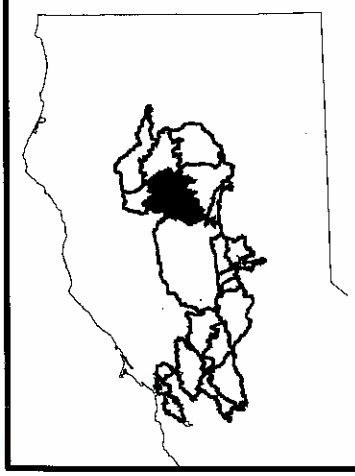
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

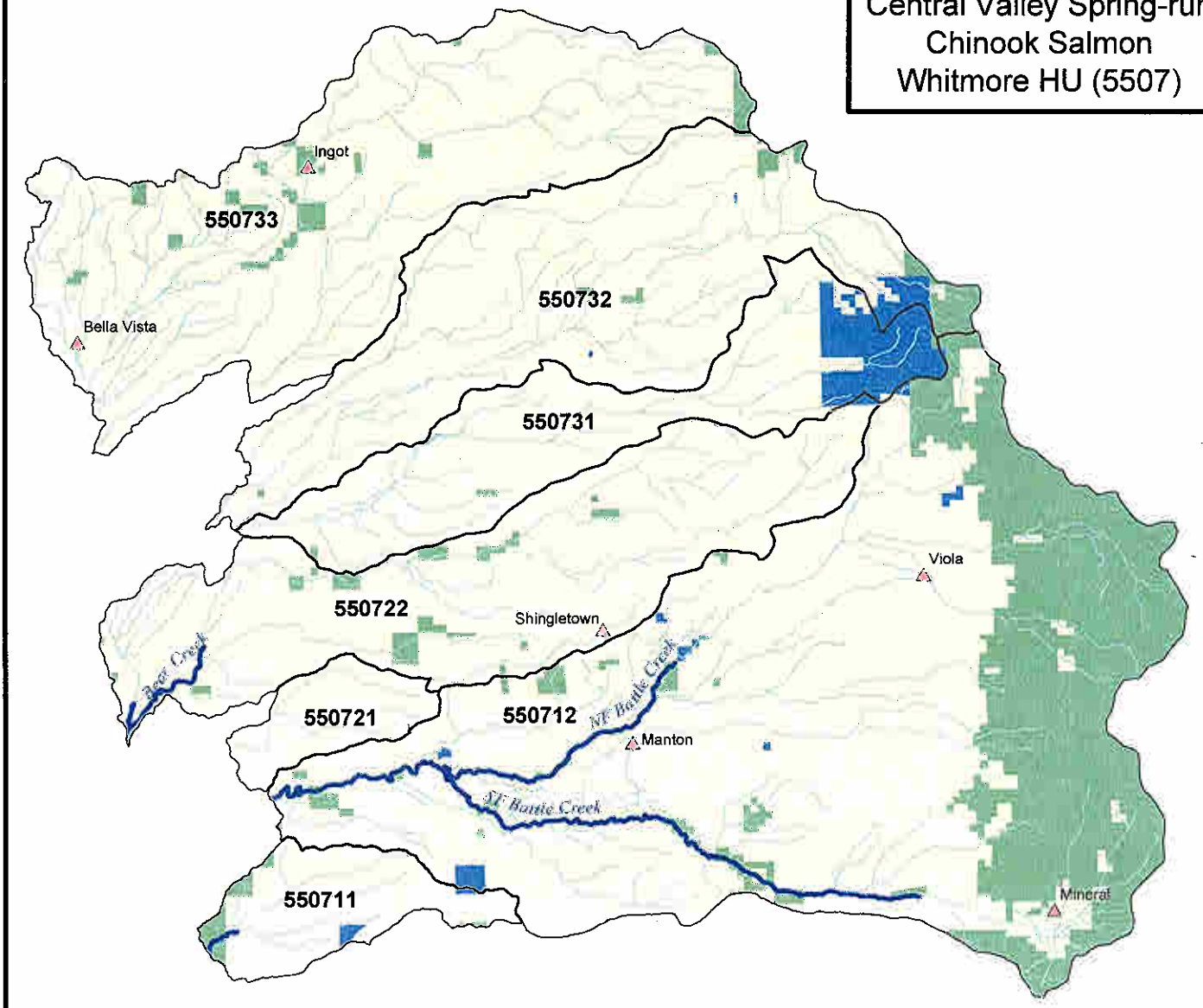
N

0 2.5 5 Miles

Central Valley Spring-run Chinook Salmon ESU



Land Ownership
Central Valley Spring-run Chinook Salmon
Whitmore HU (5507)



Cities
Chinook Presence Streams
Hydrologic Unit Boundary

Land Ownership*

Tribal
Federal
State/Local
Private/Other
Water

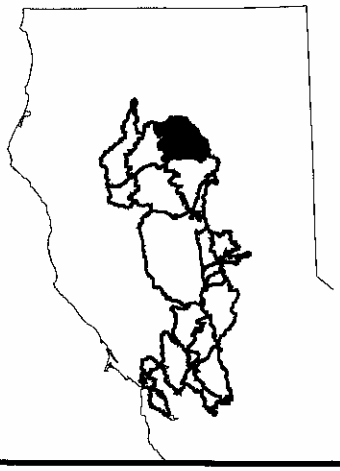
*Source: California Environmental Resources Evaluation System (CERES), 1999

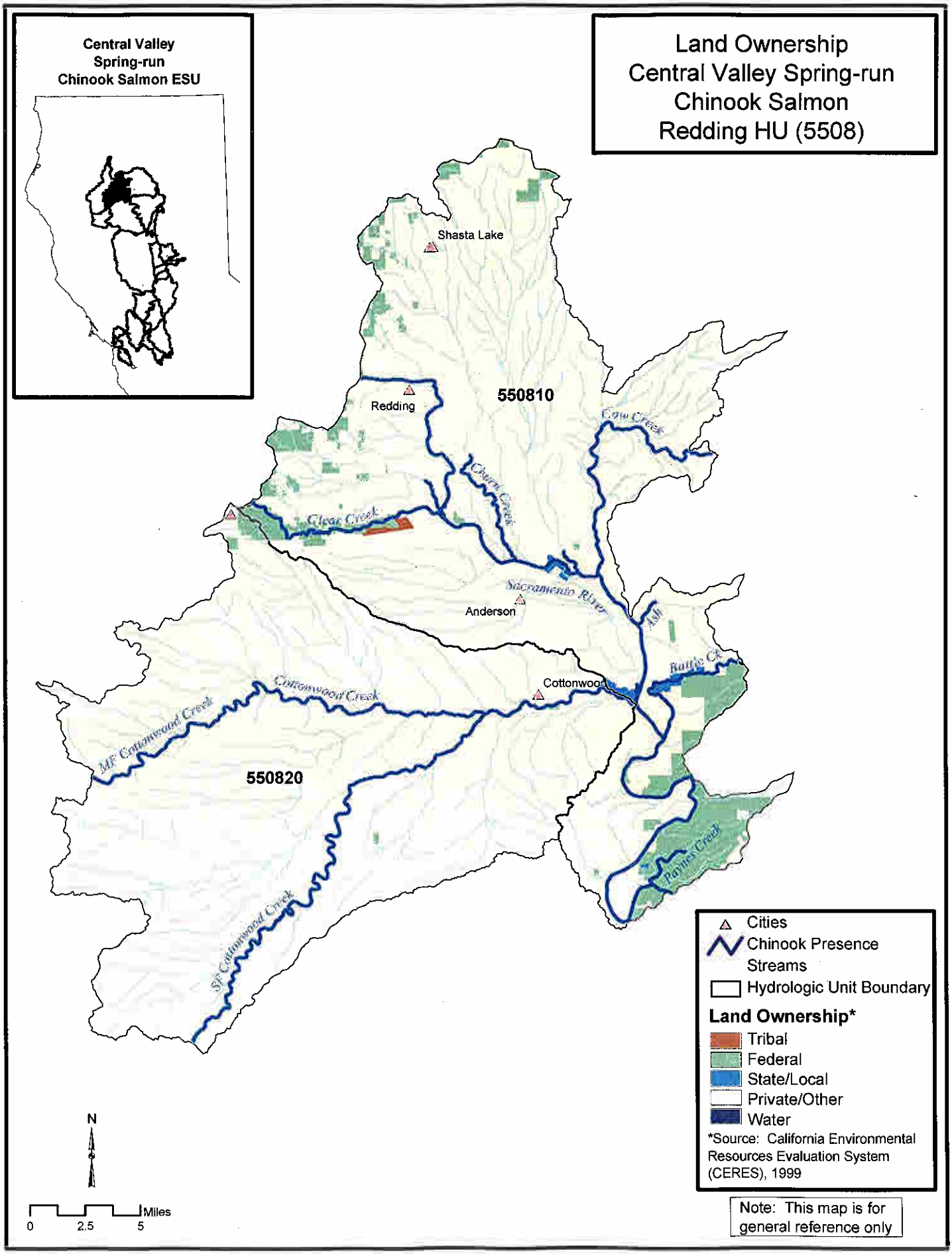
Note: This map is for general reference only

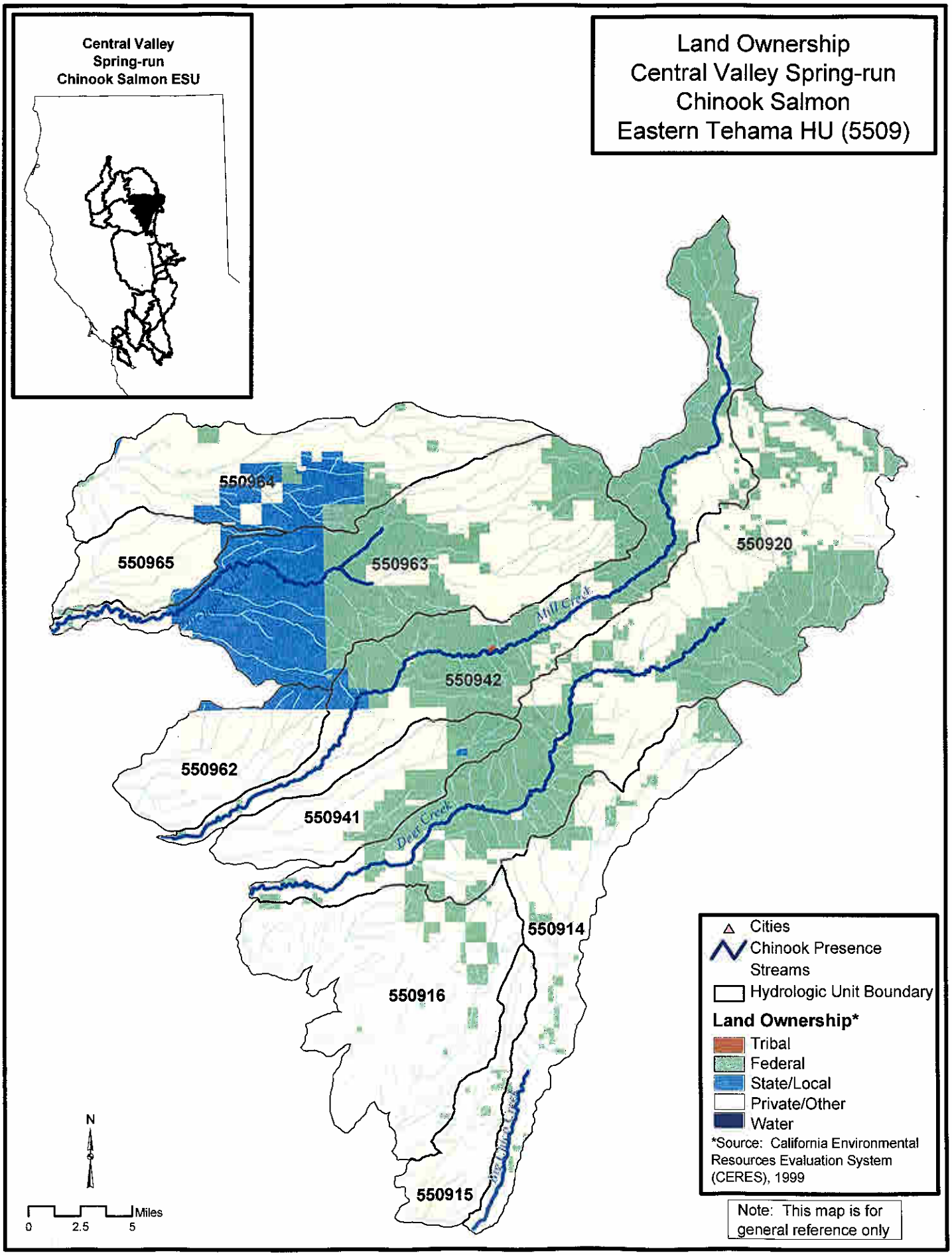
N

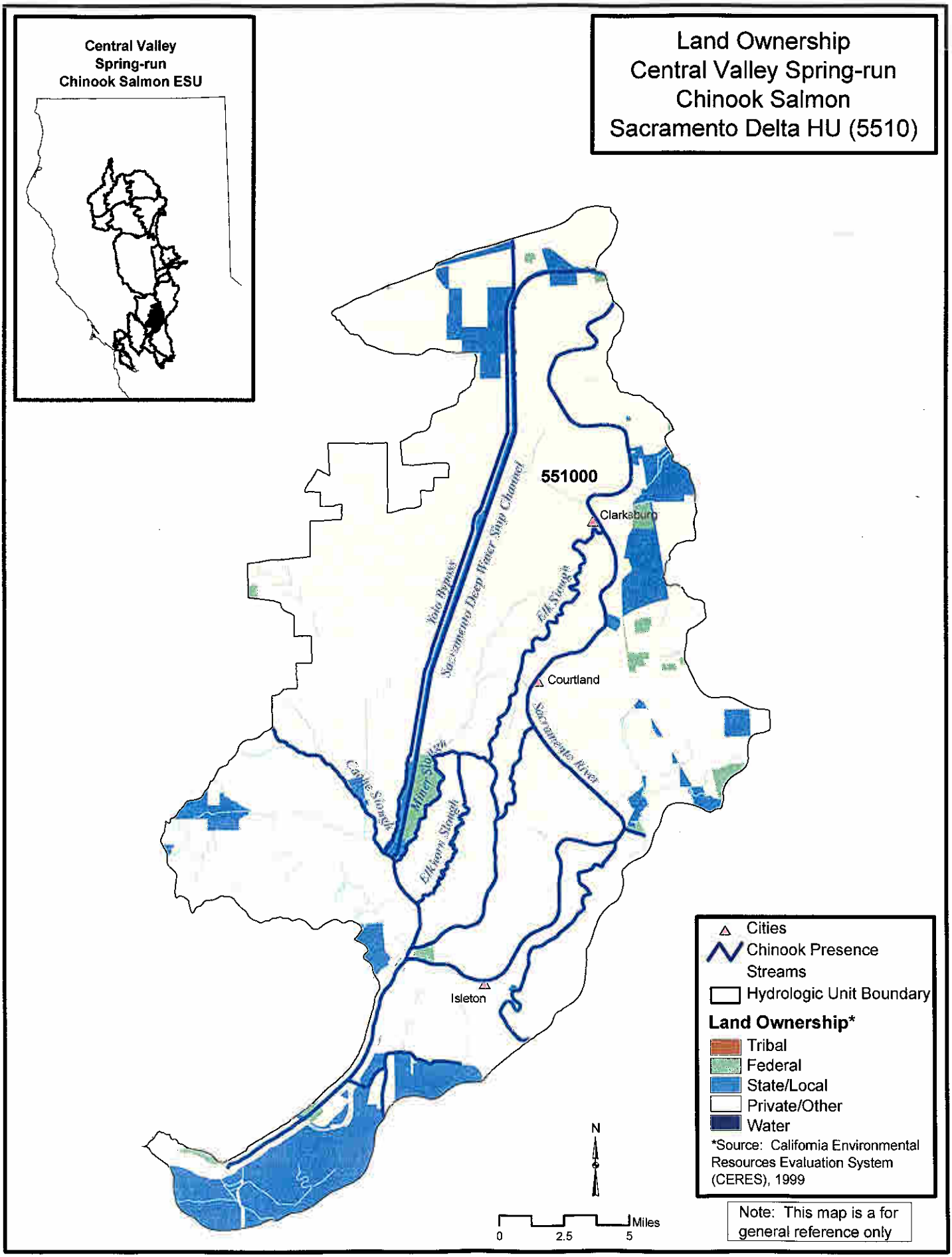
0 2.5 5 Miles

Central Valley Spring-run Chinook Salmon ESU

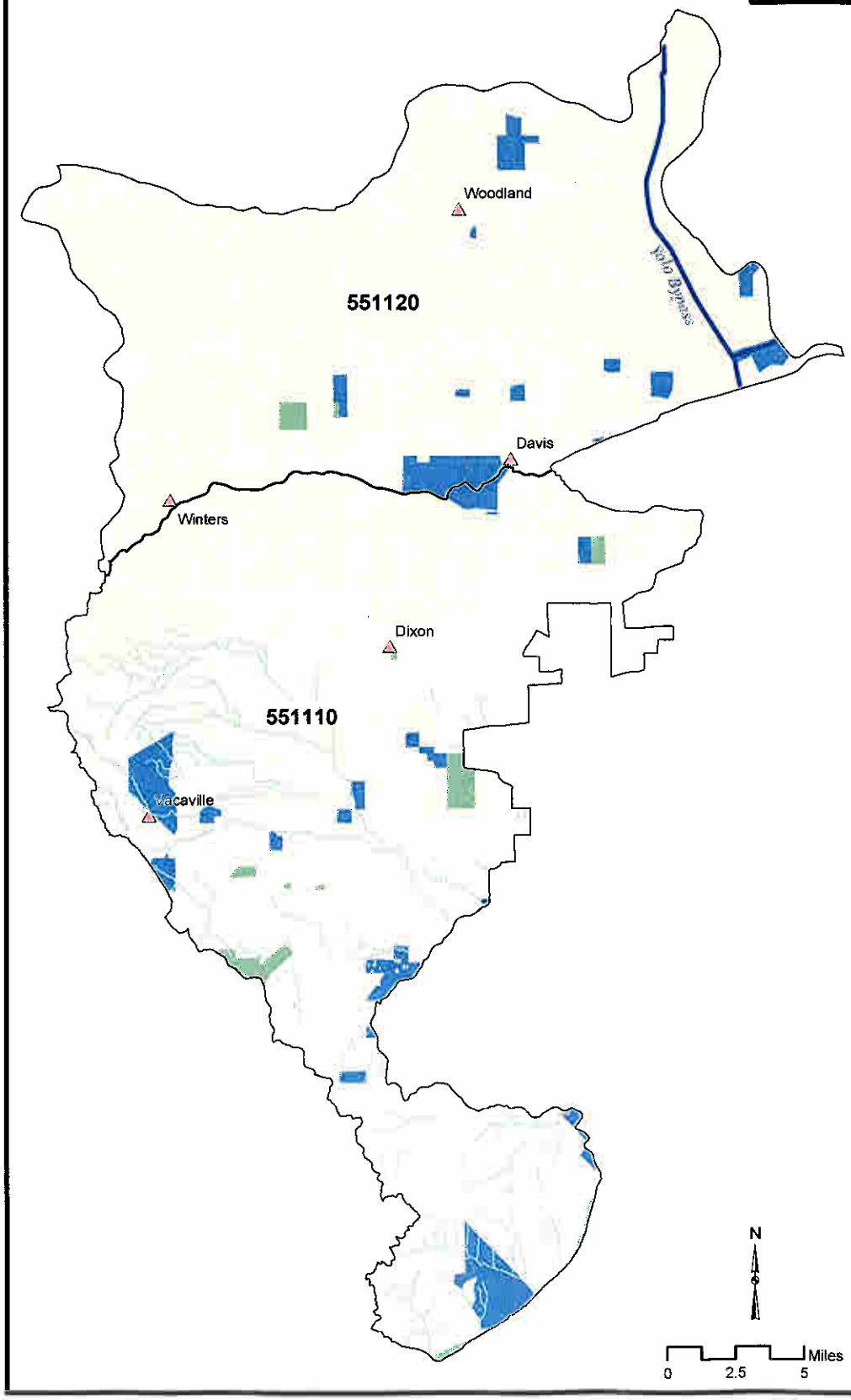


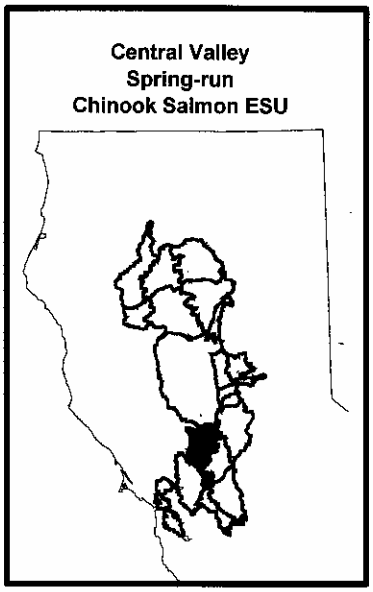

Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Redding HU (5508)
Shasta Lake
Redding
550810
Cow Creek
Clear Creek
Churn Creek
Sacramento River
Anderson
Ash
Battle Ck
Cottonwood
Cottonwood Creek
MF Cottonwood Creek
550820
Paynes Creek
SF Cottonwood Creek
Cities
Chinook Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0
2.5
5
Miles
Note: This map is for general reference only


Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Eastern Tehama HU (5509)
550964
550965
550963
550920
550942
550962
550941
550914
550916
550915
Mill Creek
Deer Creek
Dry Creek
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
Miles
0
2.5
5
Note: This map is for general reference only


Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Sacramento Delta HU (5510)
551000
Clarksburg
Courtland
Isleton
Yolo Bypass
Sacramento Deep Water Ship Channel
Elk Slough
Miner Slough
Cache Slough
Elkhorn Slough
Sacramento River
Cities
Chinook Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
N
0
2.5
5
Miles
Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Valley Putah-Cache HU (5511)





- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

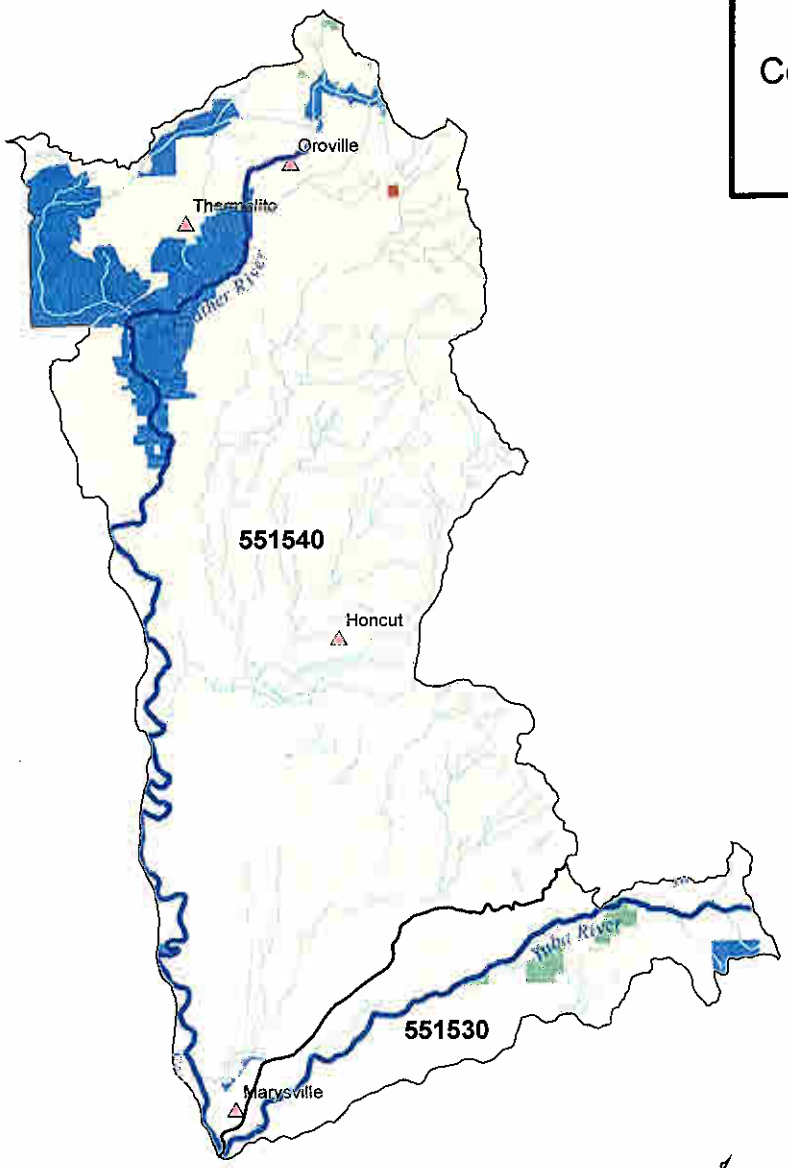
Land Ownership*

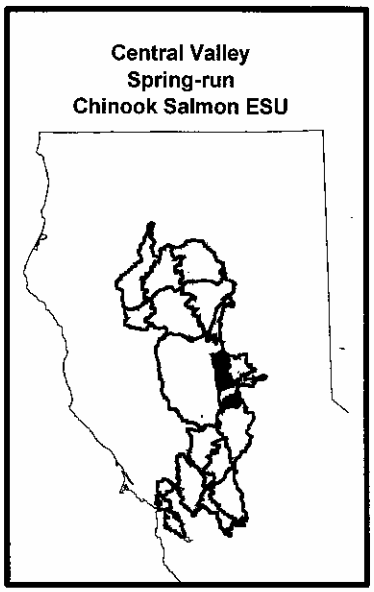
- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Marysville HU (5515)





- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

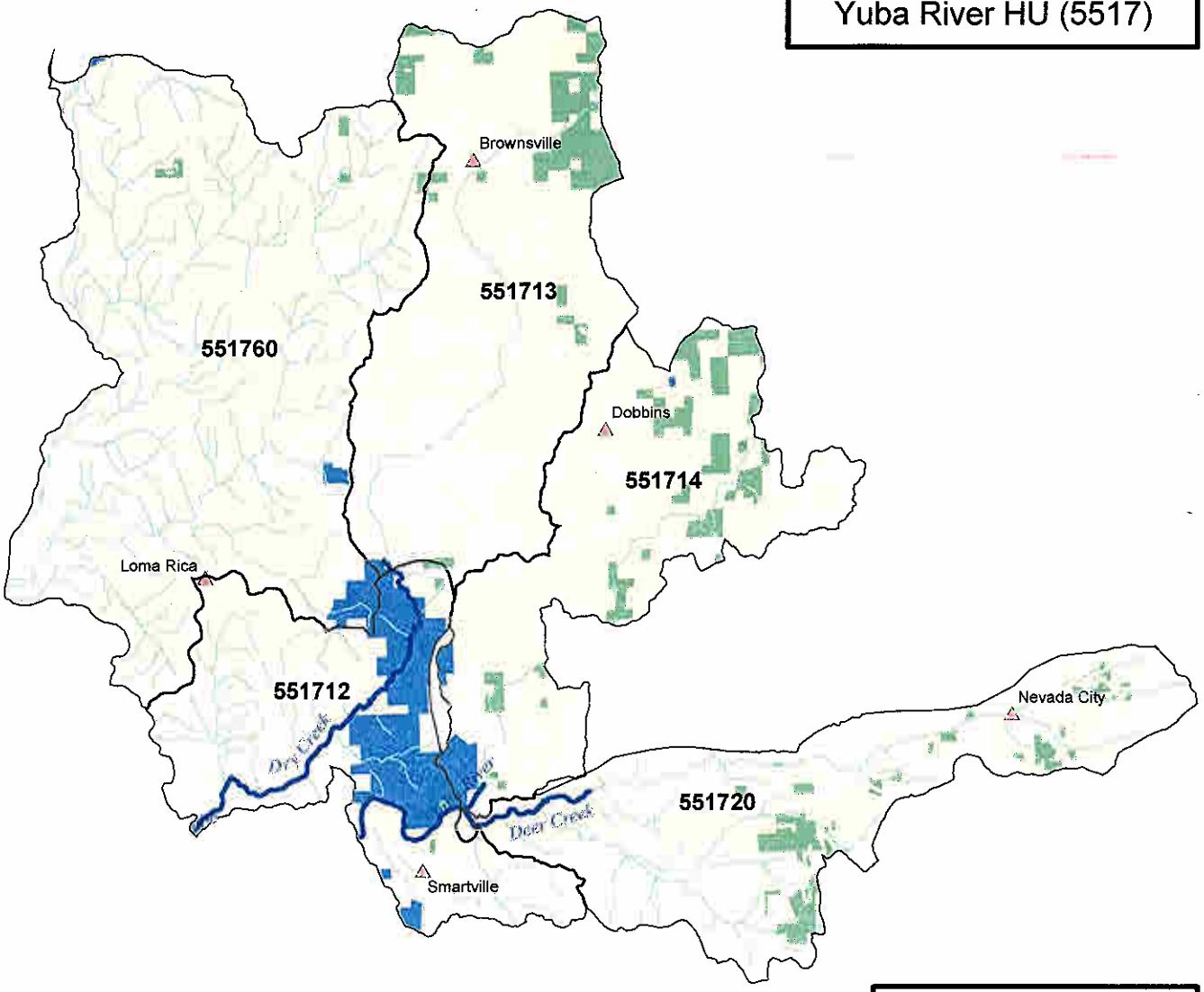
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

N

0 2.5 5 Miles

Land Ownership
Central Valley Spring-run Chinook Salmon
Yuba River HU (5517)



Cities
Chinook Presence Streams
Hydrologic Unit Boundary

Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water

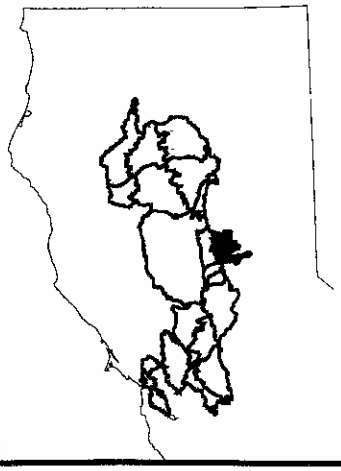
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

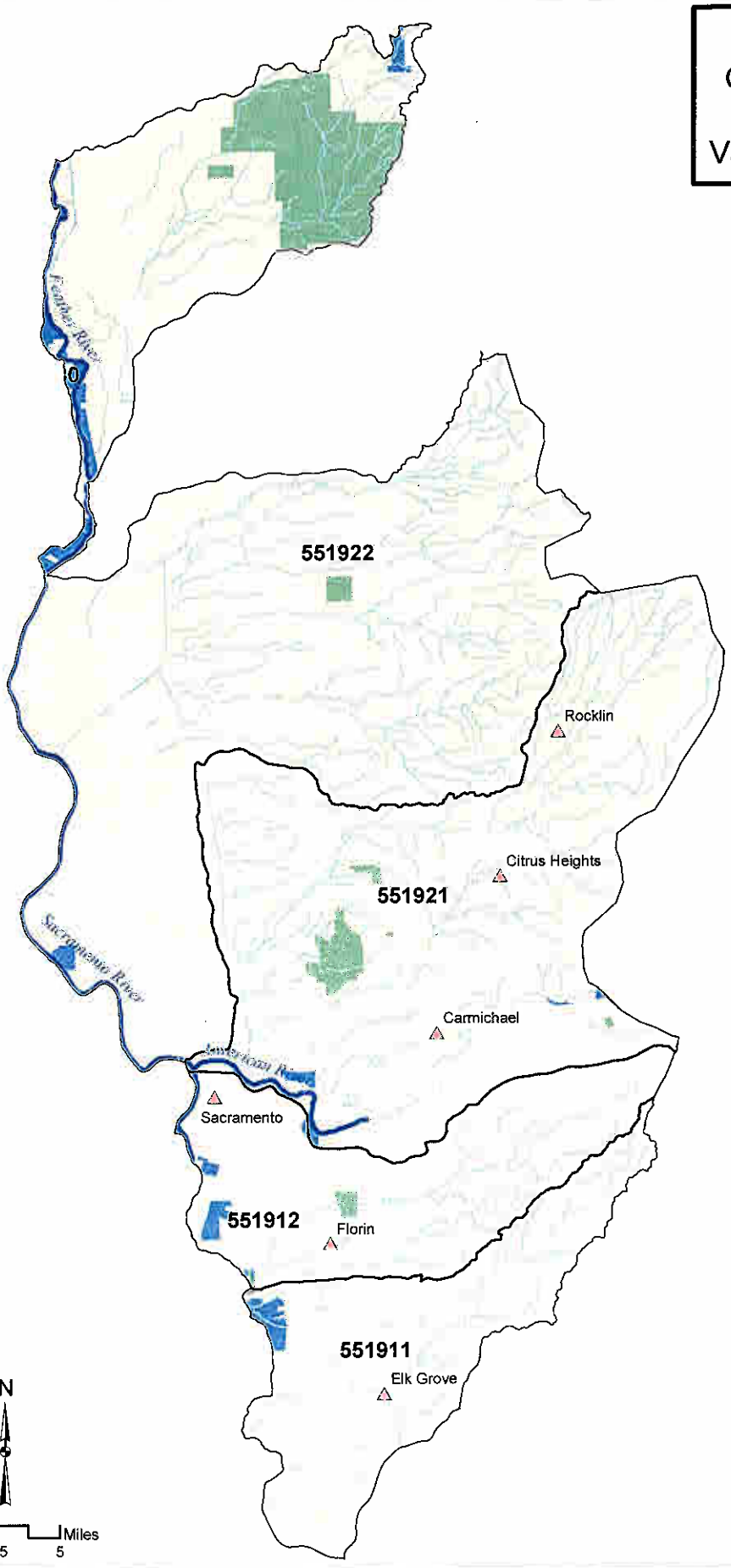
N

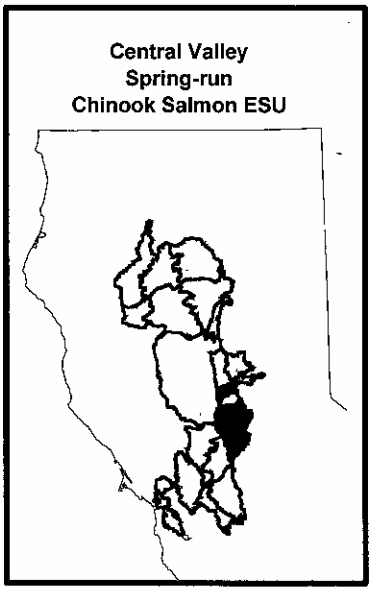
0 2.5 5 Miles

Central Valley Spring-run Chinook Salmon ESU



Land Ownership
Central Valley Spring-run Chinook Salmon
Valley-American HU (5519)





Cities
Chinook Presence Streams
Hydrologic Unit Boundary

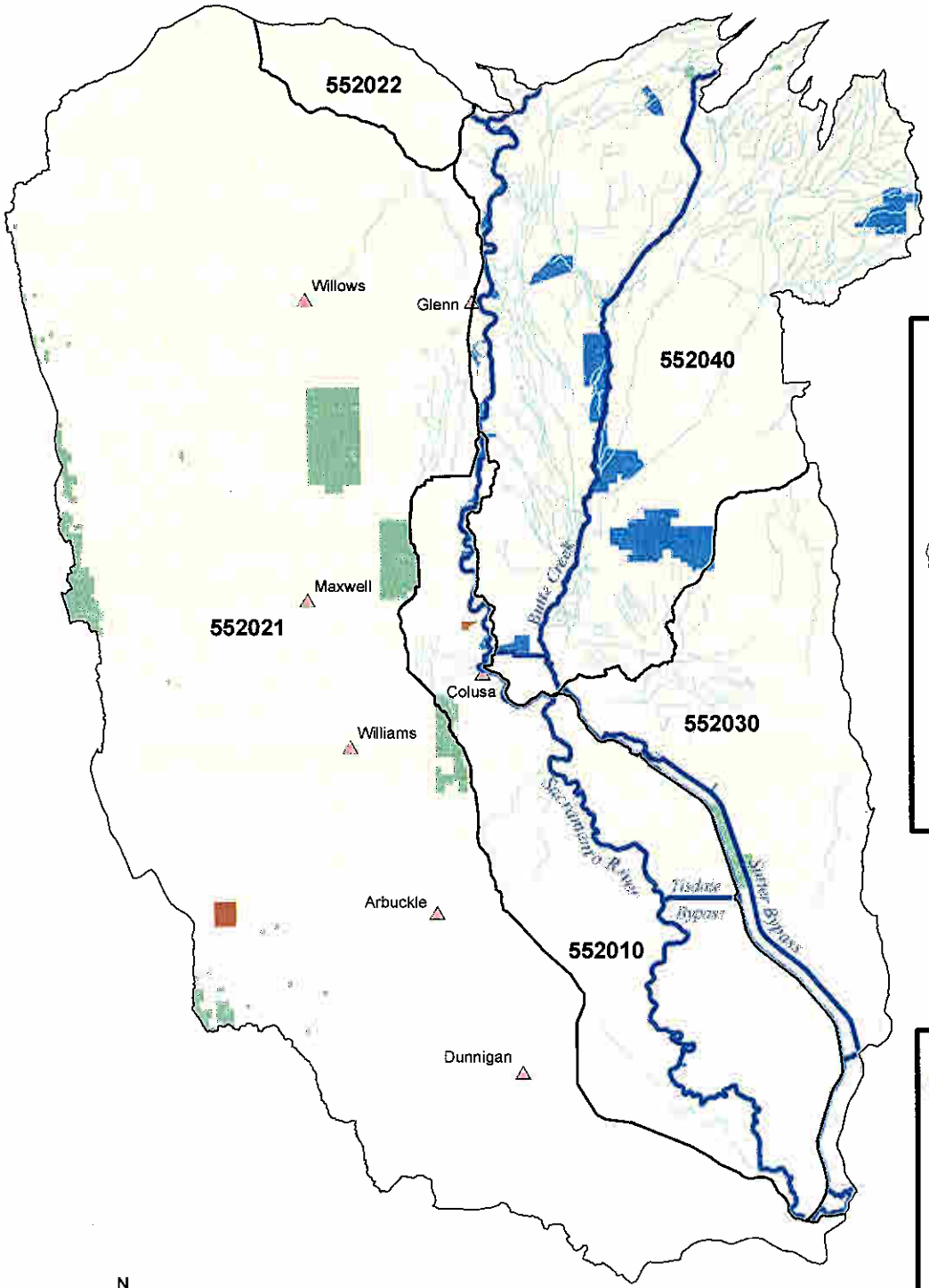
Land Ownership*

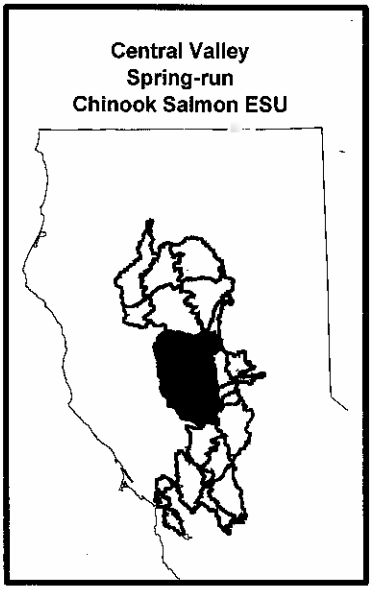
Tribal
Federal
State/Local
Private/Other
Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Colusa Basin HU (5520)





- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

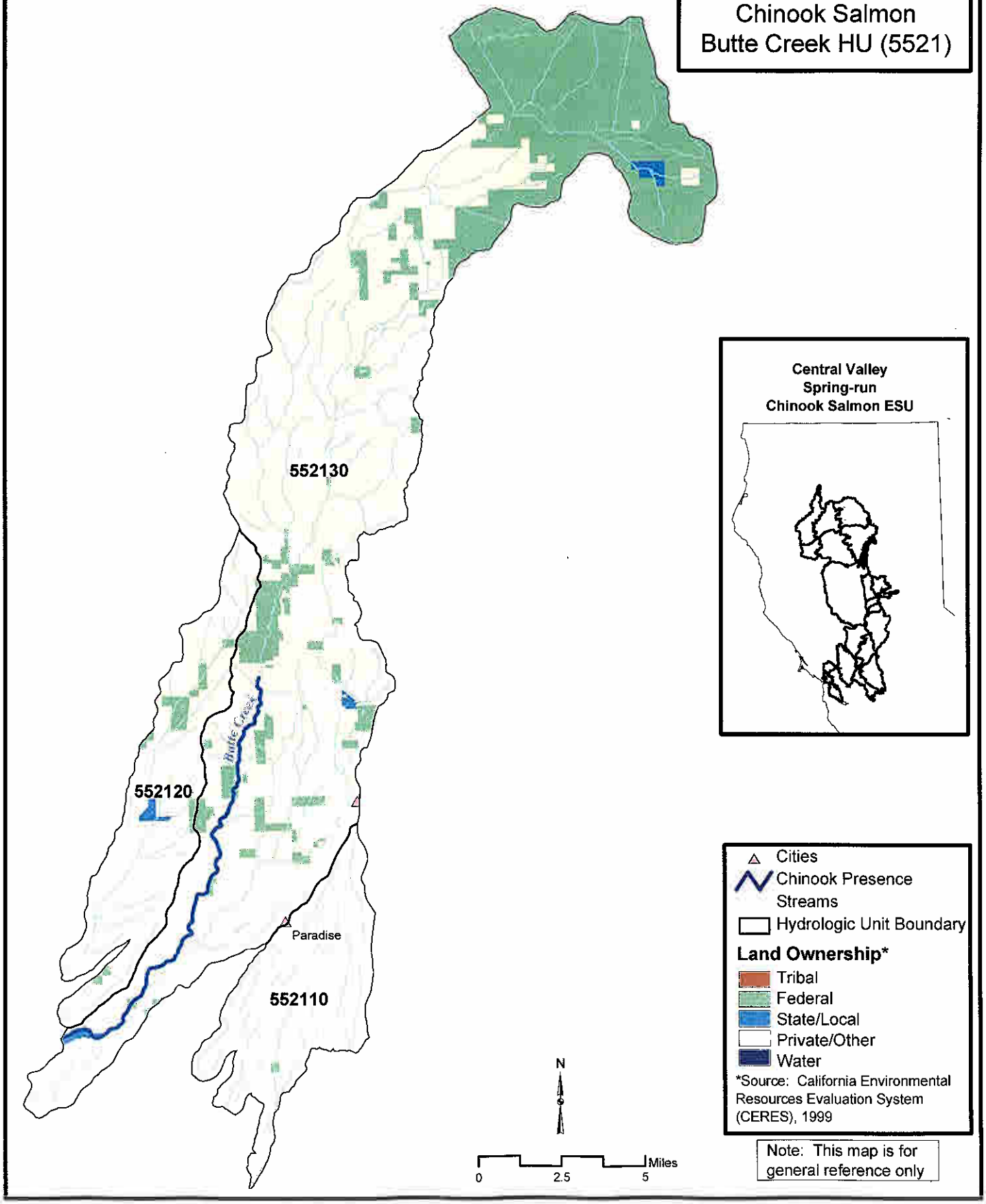
Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is a for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
Butte Creek HU (5521)



Central Valley Spring-run Chinook Salmon ESU

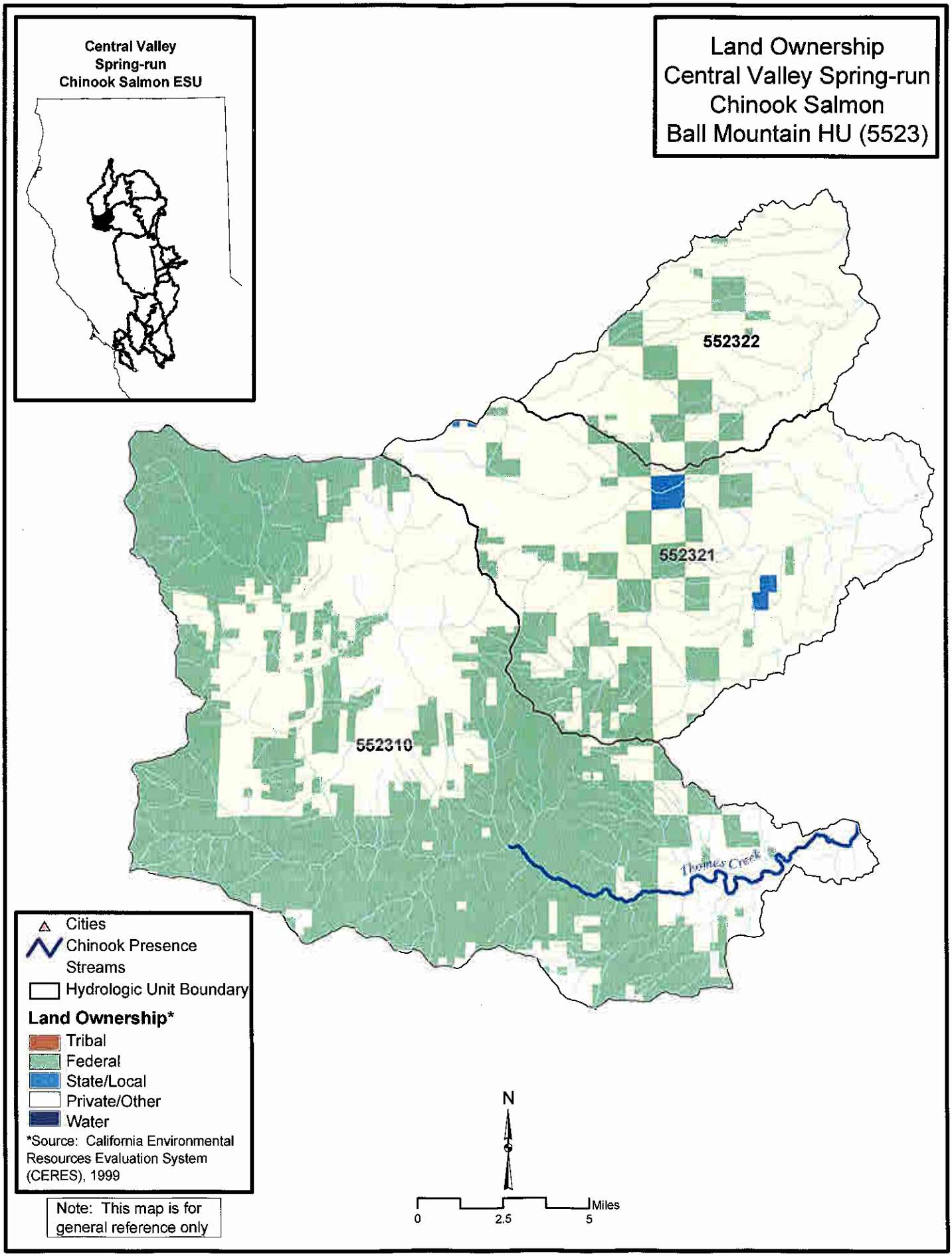
- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

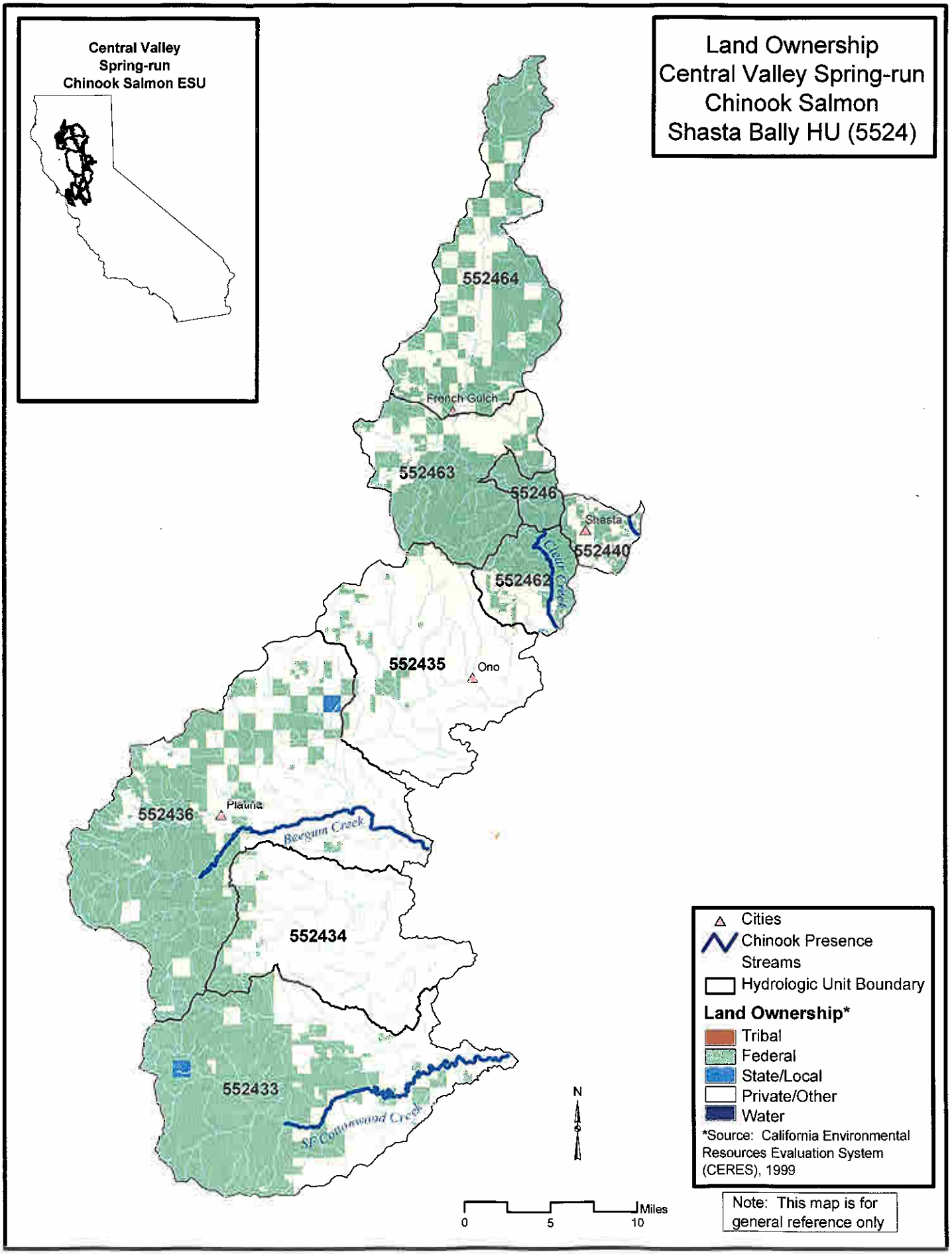
Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

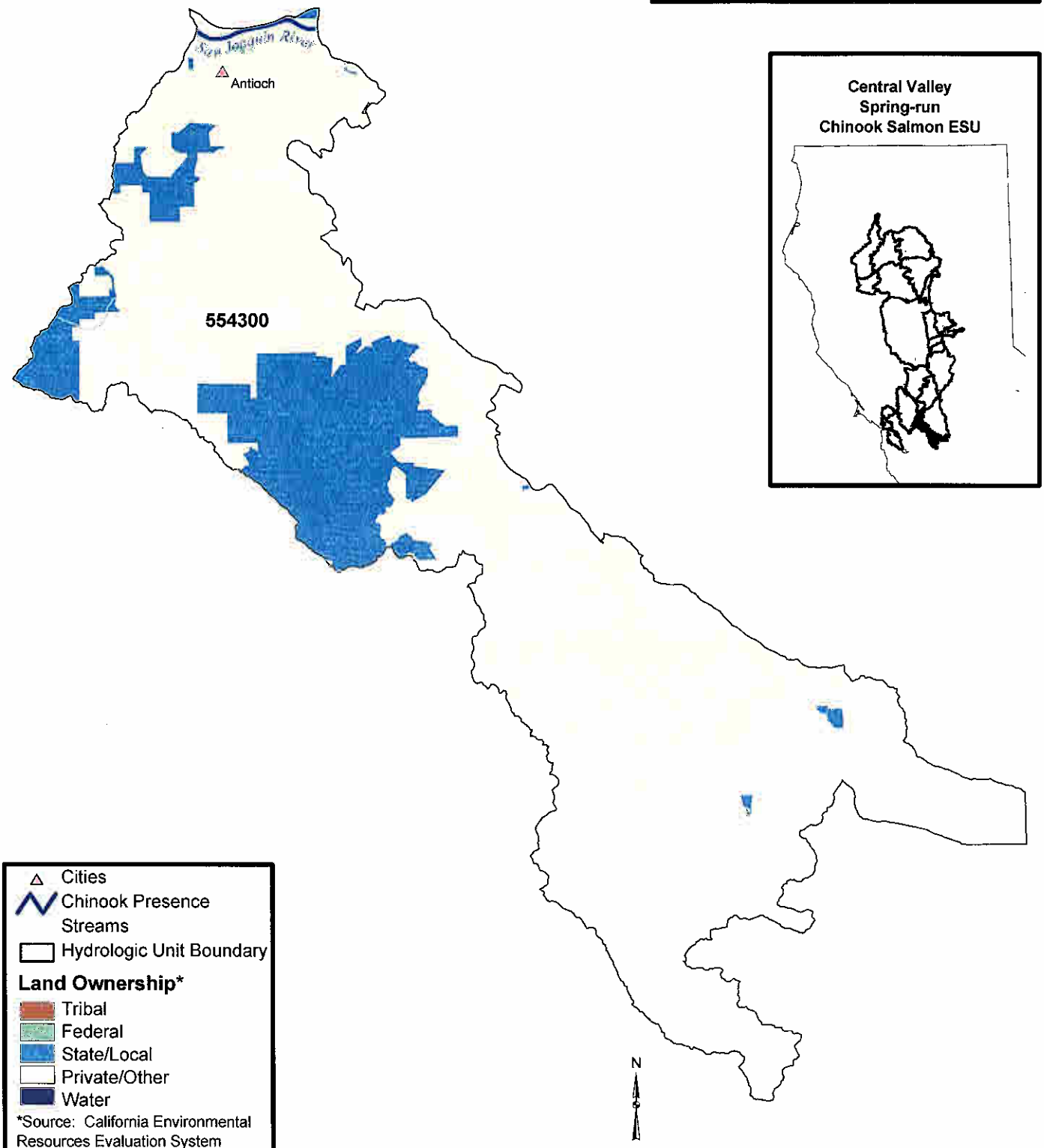
*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only

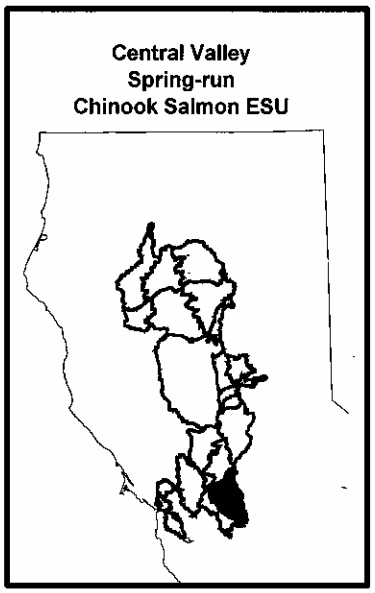

Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Ball Mountain HU (5523)
552322
552321
552310
Holmes Creek
Cities
Chinook Presence
Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only
N
0
2.5
5
Miles

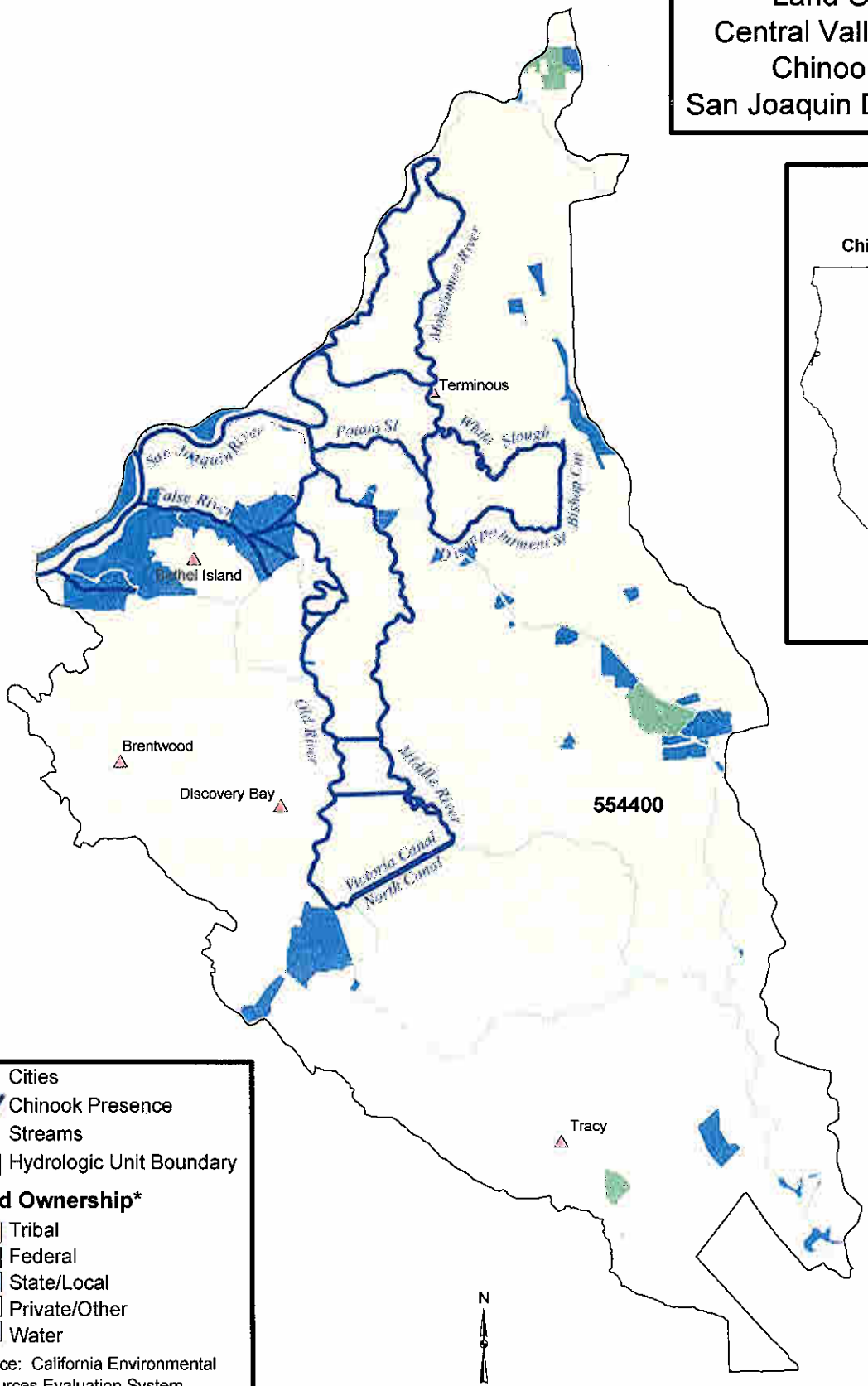

Central Valley
Spring-run
Chinook Salmon ESU
Land Ownership
Central Valley Spring-run
Chinook Salmon
Shasta Bally HU (5524)
552464
French Gulch
552463
55246
Shasta
552440
552462
Clear Creek
552435
Ono
552436
Platina
Beegum Creek
552434
552433
SF Cottonwood Creek
N
0
5
10
Miles
Cities
Chinook Presence Streams
Hydrologic Unit Boundary
Land Ownership*
Tribal
Federal
State/Local
Private/Other
Water
*Source: California Environmental Resources Evaluation System (CERES), 1999
Note: This map is for general reference only

Land Ownership
Central Valley Spring-run Chinook Salmon
North Diablo Range HU (5543)



Land Ownership
Central Valley Spring-run Chinook Salmon
San Joaquin Delta HU (5544)





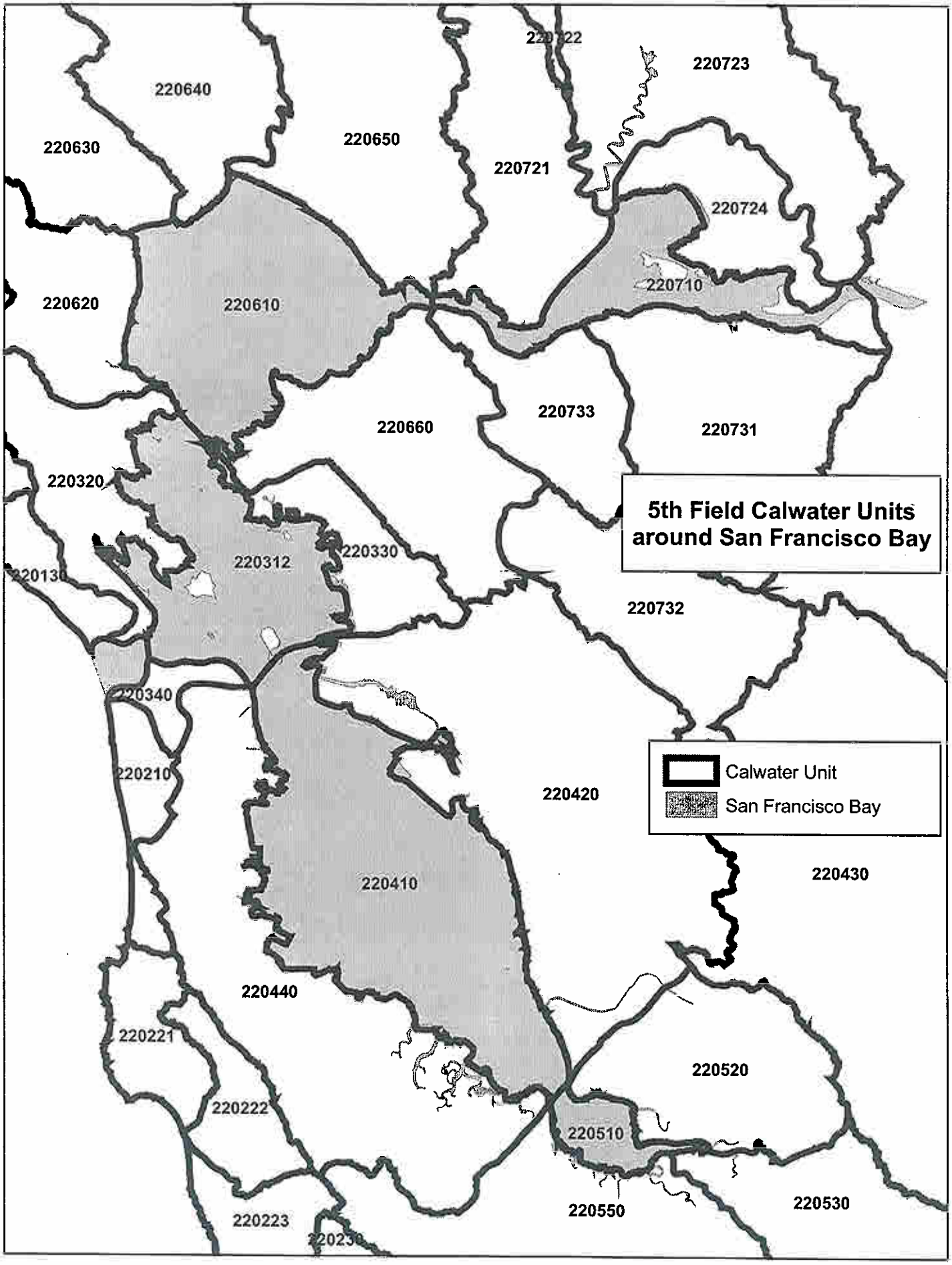
- Cities
- Chinook Presence Streams
- Hydrologic Unit Boundary

Land Ownership*

- Tribal
- Federal
- State/Local
- Private/Other
- Water

*Source: California Environmental Resources Evaluation System (CERES), 1999

Note: This map is for general reference only


220640
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220330
220130
220732
220340
220210
220420
220410
220430
220440
220221
220520
220222
220510
220223
220550
220530
220230
5th Field Calwater Units around San Francisco Bay
Calwater Unit
San Francisco Bay

Map F17. Final CHART Ratings of Conservation Value for Calwater HSA Watersheds occupied by the Central Valley spring run chinook ESU

California Central Valley Spring-run Chinook Watershed Conservation Ranking

Map of the fifth-field watersheds occupied by the Central Valley Spring-run Chinook Salmon Evolutionarily Significant Unit (ESU) and eligible for designation as critical habitat.